Ulric Sloane, Jr
12 Campbell
Princeton University

Culture is the sum total of adjustments to environment.
Civilization is the relative advancement of culture..
Nationality is a political group bound by common memories of the past, and similarities of race, culture, language, or political state.

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ANTHROPOLOGY

By

LFRED

A. L. KROEBER

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PREFACE

In the preparation of Chapters II, III, and VI of this book I have drawn on a University of California syllabus, ''Three Essays on the Antiquity and Races of Man''; for Chapter VII, on an article ''Heredity, Environment, and Civilization'' in the *American Museum Journal* for 1918; and Chapter V makes use of some passages of ''The Languages of the American Indians'' from the *Popular Science Monthly* of 1911. In each case there has been revision and for the most part rewriting.

Whatever quality of lucidity the volume may have is due to several thousand young men and women with whom I have been associated during many years at the University of California. Without their unwitting but real co-authorship the book might never have been written, or would certainly have been written less simply.

A. L. K.

Berkeley, California,
January 22, 1923.

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ANTHROPOLOGY

CHAPTER I

SCOPE AND CHARACTER OF ANTHROPOLOGY

1. Anthropology, biology, history.—2. Organic and social elements.—3. Physical anthropology.—4. Cultural anthropology.—5. Evolutionary processes and evolutionistic fancies.—6. Age of anthropological science.

1. ANTHROPOLOGY, BIOLOGY, HISTORY

Anthropology is the science of man. This broad and literal definition takes on more meaning when it is expanded to "the science of man and his works." Even then it may seem heterogeneous and too inclusive. The products of the human mind are something different from the body. And these products, as well as the human body, are the subjects of firmly established sciences, which would seem to leave little room for anthropology except as a less organized duplication. Ordinary political history, economics, literary criticism, and the history of art all deal with the works and doings of man; biology and medicine study his body. It is evident that these various branches of learning cannot be relegated to the position of mere subdivisions of anthropology and this be exalted to the rank of a sort of holding corporation for them. There must be some definite and workable relation.

One way in which this relation can be pictured follows to some extent the course of anthropology as it grew into self-consciousness and recognition. Biology, medicine, history, economics were all tilling their fields of knowledge in the nineteenth century, some with long occupancy, when anthropology shyly entered the scene and began to cultivate a corner here and a patch there. It examined some of the most special and non-utilitarian aspects of the human body: the shape of the head, the complexion, the texture of the hair, the differences between one variety of man and another, points of negligible import in medicine and of quite narrow interest as against the broad principles which biology was trying to found and fortify as the science of all life. So too the historical sciences had preempted the most convenient and fruitful subjects within reach. Anthropology modestly turned its attention to nations without records, to histories without notable events, to institutions strange in flavor and inventions hanging in their infancy, to languages that had never been written.

Yet obviously the heterogeneous leavings of several sciences will never weld into an organized and useful body of knowledge. The dilettante, the collector of oddities who loves incoherence, may be content to observe to-day the flare of the negro's nostrils, to-morrow the intricacy of prefixes that bind his words into sentences, the day after, his attempts to destroy a foe by driving nails into a wooden idol. A science becomes such only when it learns to discover relations and a meaning in facts. If anthropology were to remain content with an interest in the Mongolian eye, the dwarfishness of the Negrito, the former home of the Polynesian race, taboos against speaking to one's mother-in-law, rituals to make rain, and other such exotic and superseded superstitions, it would earn no more dignity than an antiquarian's attic. As a co-laborer on the edifice of fuller understanding, anthropology must find more of a task than filling with rubble the temporarily vacant spaces in the masonry that the sciences are rearing.

The other manner in which the subject of anthropology can be conceived is that this is neither so vast as to include everything human, nor is it the unappropriated odds and ends of other sciences, but rather some particular aspect of human phenomena. If such an aspect exists, anthropology vindicates its unity and attains to integrity of aim.

2. Organic and Social Elements

To the question why a Louisiana negro is black and thick lipped, the answer is ready. He was born so. As dogs produce pups, and lions cubs, so negro springs from negro and Caucasian from Caucasian. We call the force at work, heredity. The same negro is lazy by repute, easy going at his labor. Is this too an innate quality? Off-hand, most of us would reply: Yes. He sings at his corn-hoeing more frequently than the white man across the fence. Is this also because of his heredity? "Of course: he is made so," might be a common answer; "Probably: why not?" a more cautious one. But now our negro is singing Suwanee River, which his great-grandfather in Africa assuredly did not sing. As regards the specific song, heredity is obviously no longer the cause. Our negro may have learned it from an uncle, perhaps from his schoolmates; he can have acquired it from human beings not his ancestors, acquired it as part of his customs, like being a member of the Baptist church and wearing overalls, and the thousand other things that come to him from without instead of from within. At these points heredity is displaced by tradition, nature by nurture, to use a familiar jingle. The efficient forces now are quite different from those that made his skin black and his lips thick. They are causes of another order.

The particular song of the negro and his complexion represent the clear-cut extremes of the matter. Between them lie the sloth and the inclination to melody. Obviously these traits may also be the result of human example, of social environment, of contemporary tradition. There are those that so believe, as well as those who see in them only the effects of inborn biological impulse. Perhaps these intermediate dubious traits are the results of a blending of nature and nurture, the strength of each factor varying according to each trait or individual examined. Clearly, at any rate, there is room here for debate and evidence. A genuine problem exists. This problem cannot be solved by the historical sciences alone because they do not concern themselves with heredity. Nor can it be solved by biology which deals with heredity and allied factors but does not go on to operate with the non-biological principle of tradition.

Here, then, is a specific task and place in the sun for anthropology: the interpretation of those phenomena into which both organic and social causes enter. The untangling and determination and reconciling of these two sets of forces are anthropology's own. They constitute, whatever else it may undertake, the focus of its attention and an ultimate goal. No other science has grappled with this set of problems as its primary end. Nor has anthropology as yet much of a solution to offer. It may be said to have cleared the ground of brush, rather than begun the felling of its tree. But, in the terminology of science, it has at least defined its problem.

To deal with this interplay of what is natural and nurtural, organic and social, anthropology must know something of the organic, as such, and of the social, as such. It must be able to recognize them with surety before it endeavors to analyze and resynthesize them. It must therefore effect close contact with the organic and the social sciences respectively, with ''biology'' and ''history,'' and derive all possible aid from their contributions to knowledge. Up to the present time, a large part of the work of anthropology has consisted in acquiring the fruits of the activity of these sister sciences and applying them for its own ends; or, where the needed biological and historical data were not available, securing them.

3. Physical Anthropology

The organic sciences underlie the social ones. They are more directly ''natural.'' Anthropology has therefore found valuable general principles in biology: laws of heredity, the doctrines of cell development and evolution, for instance, based on facts from the whole range of life. Its business has been to ascertain how far these principles apply to man, what forms they take in his particular case. This has meant a concentration of attention, the devising of special methods of inquiry. Many biological problems, including most physiological and hereditary ones, can be most profitably attacked in the laboratory, or at least under experimental conditions. This method, however, is but rarely open as regards human beings, who must ordinarily be observed as they are. The phenomena concerning man have to be taken as they come and laboriously sifted and re-sifted afterward, instead of being artificially simplified in advance, as by the experimental method. Then, too, since anthropology was operating within the narrow limits of one species, it was driven to concern itself with minute traits, such as the zoölogist is rarely troubled with: the proportions of the length and breadth of the skull—the famous cephalic index—for instance; the number of degrees the arm bones are twisted, and the like. Also, as these data had to be used in the gross, unmodifiable by artificially varied conditions, it has been necessary to secure them from all possible varieties of men, different races, sexes, ages, and their nearest brute analogues. The result is that biological or physical anthropology—"Somatology" it is sometimes called in Anglo-Saxon countries, and simply "anthropology" in continental Europe—has in part constituted a sort of specialization or sharpening of general biology, and has become absorbed to a considerable degree in certain particular phenomena and methods of studying them about which general biologists, physiologists, palæontologists, and students of medicine are usually but vaguely informed.

4. Cultural Anthropology

The historical or social sciences overlie the organic ones. Men's bodies and natural equipment are back of their deeds and accomplishments as transmitted by tradition, primary to their culture or civilization. The relation of anthropology to historical science has therefore been in a sense the opposite of its relation to biological science. Instead of specializing, anthropology has been occupied with trying to generalize the findings of history. Historians cannot experiment. They deal with the concrete, with the unique; for in a degree every historical event has something unparalleled about it. They may paint with a broad sweep, but they do not lay down exact laws.

Moreover, history inevitably begins with an interest in the present and in ourselves. In proportion as it reaches back in time and to wholly foreign peoples, its interest tends to flag and its materials become scant and unreliable. It is commonly considered useful for a man to know that Napoleon was a Corsican and was defeated at Waterloo in 1815, but a rather pedantic piece of knowledge that Shi Hwang-ti was born in northwestern China and unified the rule of China in 221 B.C. From a theoretical or general point of view, however, one of these facts is presumably as important as the other, for if we wish to know the principles that go into the shaping of human social life or civilization, China counts for as much as France, and the ancient past for as much as the nearby present. In fact, the foreign and the old are likely to be inquired into with even more assiduity by the theoretically minded, since they may furnish wholly new clues to insight, whereas the subjects of conventional history have been so familiarized as to hold out less hope of novel conclusions still to be extricated from them.

Here, then, is the cause of the seeming preoccupation of social or cultural anthropology with ancient and savage and exotic and extinct peoples: the desire to understand better all civilizations, irrespective of time and place, in the abstract or in form of generalized principle if possible. It is not that cave men are more illuminating than Romans, or flint knives more interesting than fine porcelains or the art of printing, that has led anthropology to bear so heavily on the former, but the fact that it wanted to know about cave men and flint knives as well as about Romans and printing presses. It would be irrational to prefer the former to the latter, and anthropology has never accepted the adjudication sometimes tacitly rendered that its proper field is the primitive, as such. As well might zoölogy confine its interest to eggs or protozoans. It is probably true that many researches into early and savage history have sprung from an emotional predilection for the forgotten or neglected, the obscure and strange, the unwonted and mysterious. But such occasional personal æsthetic trends can not delimit the range of a science or determine its aims and methods. Innumerable historians have been inveterate gossips. One does not therefore insist that the only proper subject of history is backstairs intimacies.

This, then, is the reason for the special development of those subdivisions of anthropology known as Archæology, ''the science of what is old'' in the career of humanity, especially as revealed by excavations of the sites of prehistoric occupation; and Ethnology, ''the science of peoples,'' irrespective of their degree of advancement.[1]

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[1] Ethnography is sometimes separated, as more descriptive, from Ethnology as more theoretically inclined.

5. Evolutionary Processes and Evolutionistic Fancies

In their more elementary aspects the two strands of the organic and the social, or the hereditary and environmental, as they are generally called with reference to individuals, run through all human life and are distinguishable as mechanisms, as well as in their results. Thus a comparison of the acquisition of the power of flight respectively by birds in their organic development out of the ancestral reptile stem some millions of years ago, and by men as a result of cultural progress in the field of invention during the past generation, reveals at once the profound differences of process that inhere in the ambiguous concept of "evolution." The bird gave up a pair of walking limbs to acquire wings. He added a new faculty by transforming part of an old one. The sum total of his parts or organs was not greater than before. The change was transmitted only to the blood descendants of the altered individuals. The reptile line went on as it had been before, or if it altered, did so for causes unconnected with the evolution of the birds. The aeroplane, on the contrary, gave men a new faculty without impairing any of those they had previously possessed. It led to no visible bodily changes, nor alterations of mental capacity. The invention has been transmitted to individuals and groups not derived by descent from the inventors; in fact, has already influenced their careers. Theoretically, it is transmissible to ancestors if they happen to be still living. In sum, it represents an accretion to the stock of existing culture rather than a transformation.

Once the broad implications of the distinction which this example illustrates have been grasped, many common errors are guarded against. The program of eugenics, for instance, loses much of its force. There is certainly much to be said in favor of intelligence and discrimination in mating, as in everything else. There is need for the acquisition of exacter knowledge on human heredity. But, in the main, the claims sometimes made that eugenics is necessary to preserve civilization from dissolution, or to maintain the flourishing of this or that nationality, rest on the fallacy of recognizing only organic causes as operative, when social as well as organic ones are active—

when indeed the social factors may be much the more powerful ones. So, in what are miscalled race problems, the average thought of the day still reasons largely from social effects to organic causes and perhaps vice versa. Anthropology is by no means yet in a position to state just where the boundary between the contributing organic and social causes of such phenomena lies. But it does hold to their fundamental distinctness and to the importance of this distinctness, if true understanding is the aim. Without sure grasp of this principle, many of the arguments and conclusions in the present volume will lose their significance.

Accordingly, the designation of anthropology as "the child of Darwin" is most misleading. Darwin's essential achievement was that he imagined, and substantiated by much indirect evidence, a mechanism through which organic evolution appeared to be taking place. The whole history of man however being much more than an organic matter, a pure Darwinian anthropology would be largely misapplied biology. One might almost as justly speak of a Copernican or Newtonian anthropology.

What has greatly influenced anthropology, mainly to its damage, has been not Darwinism, but the vague idea of evolution, to the organic aspect of which Darwin gave such substance that the whole group of evolutionistic ideas has luxuriated rankly ever since. It became common practice in social anthropology to "explain" any part of human civilization by arranging its several forms in an evolutionary sequence from lowest to highest and allowing each successive stage to flow spontaneously from the preceding—in other words, without specific cause. At bottom this logical procedure was astonishingly naïve. We of our land and day stood at the summit of the ascent, in these schemes. Whatever seemed most different from our customs was therefore reckoned as earliest, and other phenomena disposed wherever they would best contribute to the straight evenness of the climb upward. The relative occurrence of phenomena in time and space was disregarded in favor of their logical fitting into a plan. It was argued that since we hold to definitely monogamous marriage, the beginnings of human sexual union probably lay in indiscriminate promiscuity. Since we accord precedence to descent from the father, and generally know him, early society must have reckoned descent from the mother and no one knew his father. We abhor incest; therefore the most primitive men normally married their sisters. These are fair samples of the conclusions or assumptions of the classic evolutionistic school of anthropology, whose roster was graced by some of the most illustrious names in the science. Needless to say, these men tempered the basic crudity of their opinions by wide knowledge, acuity or charm of presentation, and frequent insight and sound sense in concrete particulars. In their day, a generation or two ago, under the spell of the concept of evolution in its first flush, such methods of reasoning were almost inevitable. To-day they are long threadbare, descended to material for newspaper science or idle speculation, and evidence of a tendency toward the easy smugness of feeling oneself superior to all the past. These ways of thought are mentioned here only as an example of the beclouding that results from baldly transferring biologically legitimate concepts into the realm of history, or viewing this as unfolding according to a simple plan of progress.

6. Age of Anthropological Science

The foregoing exposition will make clear why anthropology is generally regarded as one of the newer sciences—why its chairs are few, its places in curricula of education scattered. As an organized science, with a program and a method of its own, it is necessarily recent because it could not arise until the biological and social sciences had both attained enough organized development to come into serious contact.

On the other hand, as an unmethodical body of knowledge, as an interest, anthropology is plainly one of the oldest of the sisterhood of sciences. How could it well be otherwise than that men were at least as much interested in each other as in the stars and mountains and plants and animals? Every savage is a bit of an ethnologist about neighboring tribes and knows a legend of the origin of mankind. Herodotus, the "father of history," devoted half of his nine books to pure ethnology, and Lucretius, a few centuries later, tried to solve by philosophical deduction and poetical imagination many of the same problems that modern anthropology is more cautiously attacking with the methods of science. In neither chemistry nor geology nor biology was so serious an interest developed as in anthropology, until nearly two thousand years after these ancients.

In the pages that follow, the central anthropological problems that concern the relations of the organic and cultural factors in man will be defined and solutions offered to the degree that they seem to have been validly determined. On each side of this goal, however, stretches an array of more or less authenticated formulations, of which some of the more important will be reviewed. On the side of the organic, consideration will tend largely to matters of fact; in the sphere of culture, processes can here and there be illustrated; in accord with the fact that anthropology rests upon biological and underlies purely historical science.

CHAPTER II

FOSSIL MAN

7. The "Missing Link."—8 Family tree of the Primates.—9. Geological and glacial time.—10. Place of man's origin and development.—11. Pithecanthropus.—12. Heidelberg man.—13. The Piltdown form.—14. Neandertal man.—15. Rhodesian man.—16. The Cro-Magnon race.—17. The Brünn race.—18. The Grimaldi race: Neolithic races.—19. The metric expression of human evolution.

7. THE "MISSING LINK"

No modern zoölogist has the least doubt as to the general fact of organic evolution. Consequently anthropologists take as their starting point the belief in the derivation of man from some other animal form. There is also no question as to where in a general way man's ancestry is to be sought. He is a mammal closely allied to the other mammals, and therefore has sprung from some mammalian type. His origin can be specified even more accurately. The mammals fall into a number of fairly distinct groups, such as the Carnivores or flesh-eating animals, the Ungulates or hoofed animals, the Rodents or gnawing animals, the Cetaceans or whales, and several others. The highest of these mammalian groups, as usually reckoned, is the Primate or "first" order of the animal kingdom. This Primate group includes the various monkeys and apes and man. The ancestors of the human race are therefore to be sought somewhere in the order of Primates, past or present.

The popular but inaccurate expression of this scientific conviction is that "man is descended from the monkeys," but that a link has been lost in the chain of descent: the famous "missing link." In a loose way this statement reflects modern scientific opinion; but it certainly is partly erroneous. Probably not a single authority maintains to-day that man is descended from any species of monkey now living. What students during the past sixty years have more and more come to be convinced of, was already foreshadowed by Darwin: namely that man and the apes are both descended from a common ancestor. This common ancestor may be described as a primitive Primate, who differed in a good many details both from the monkeys and from man, and who has probably long since become extinct.

The situation may be clarified by two diagrams (Fig. 1). The first diagram represents the inaccurate view which puts the monkey at the bottom of the line of descent, man at the top, and the missing link in the middle of the straight line. The illogicality of believing that our origin occurred in this manner is

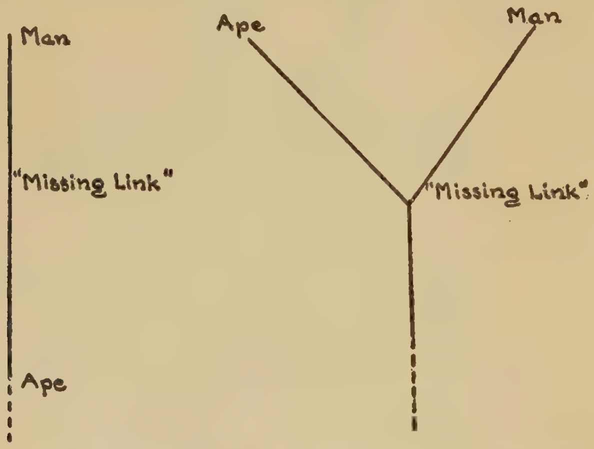

FIG. 1. Erroneous (left) and more valid (right) representation of the descent of man.

apparent as soon as one reflects that according to this scheme the monkey at the beginning and man at the end of the line still survive, whereas the "missing link," which is supposed to have connected them, has become extinct.

Clearly the relation must be different. Whatever the missing link may have been, the mere fact that he is not now alive on earth means that we must construct our diagram so that it will indicate his past existence as compared with the survival of man and the apes. This means that the missing link must be put lower in the figure than man and the apes, and our illustration therefore takes on the form shown in the right half of figure 1, which may be described as Y-shaped. The stem of the Y denotes the pre-ancestral forms leading back into other mammalian groups and through them—if carried far enough down—to the amphibians and invertebrates. The missing link comes at the fork of the Y. He represents the last point at which man and the monkeys were still one, and beyond which they separated and became different. It is just because the missing link represented the last common form that he was the link between man and the monkeys. From him onwards, the monkeys followed their own course, as indicated by the left-hand branch of the Y, and man went his separate way along the right-hand branch.

8. Family Tree of the Primates

While this second diagram illustrates the most essential elements in modern belief as to man's origin, it does not of course pretend to give the details. To make the diagram at all precise, the left fork of the Y, which here stands for the monkeys as a group—in other words, represents all the living Primates other than man—would have to be denoted by a number of branching and subdividing lines. Each of the main branches would represent one of the four or five subdivisions or ''families'' of the Primates, such as the Anthropoid or manlike apes, and the Cebidæ or South American monkeys. The finer branches would stand for the several genera and species in each of these families. For instance, the Anthropoid line would split into four, standing respectively for the Gibbon, Orang-utan, Chimpanzee, and Gorilla.

The fork of the Y representing man would not branch and rebranch so intricately as the fork representing the monkeys. Many zoölogists regard all the living varieties of man as constituting a single species, while even those who are inclined to recognize several species limit the number of these species to three or four. Then too the known extinct varieties of man are comparatively few. There is some doubt whether these human fossil types are to be reckoned as direct ancestors of modern man, and therefore as mere points in the main human line of our diagram; or whether they are to be considered as having been ancient collateral relatives who split off from the main line of human development. In the latter event, their designation in the diagram would have to be by shorter lines branching out of the human fork of the Y.

This subject quickly becomes a technical problem requiring rather refined evidence to answer. In general, prevailing opinion looks upon the later fossil ancestors of man as probably direct or true ancestors, but tends to regard the earlier of these extinct forms as more likely to have been collateral ones. This verdict applies with particular force to the earliest of all, the very one which comes nearest to fulfilling the popular idea of the missing link: the so-called *Pithecanthropus erectus.* If the Pithecanthropus were truly the missing link, he would have to be put at the exact crotch of the Y. Since he is recognized, however, as a form more or less ancestral to man, and somewhat less ancestral to the apes, he should probably be placed a short distance up on the human stem of the Y, or close alongside it. On the other hand, inasmuch as most palæontologists and comparative anatomists believe that Pithecanthropus was not directly ancestral to us, in the sense that no living men have Pithecanthropus blood flowing in their veins, he would therefore be an ancient collateral relative of humanity—a sort of great-great-

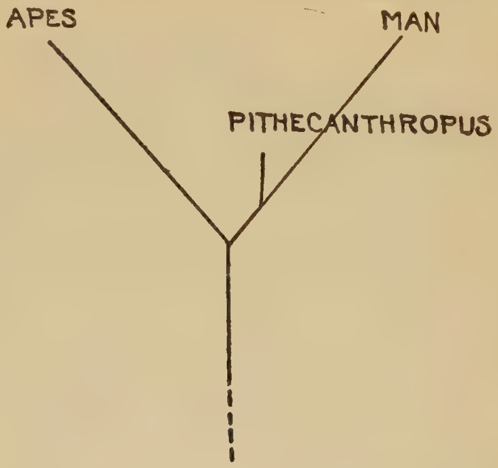

FIG. 2. The descent of man, elaborated over Figure 1. For further ramifications, see Figures 3, 4, 9.

granduncle—and would be best represented by a short stub coming out of the human line a little above its beginning (Fig. 2).

Even this figure is not complete, since it is possible that some of the fossil types which succeeded Pithecanthropus in point of time, such as the Heidelberg and Piltdown men, were also collateral rather than direct ancestors. Some place even the later Neandertal man in the collateral class. It is only when the last of the fossil types, the Cro-Magnon race, is reached, that opinion becomes comparatively unanimous that this is a form directly ancestral to us. For accuracy, therefore, figure 2 might be revised by the addition of other short lines to represent the several earlier fossil types: these would successively spring from the main human line at higher and higher levels.

In order not to complicate unnecessarily the fundamental facts of the case—especially since many data are still interpreted somewhat variously—no attempt will be made here to construct such a complete diagram as authoritative. Instead, there are added reproductions of the family tree of man and the apes as the lineages have been worked out independently by two authorities (Figs. 3, 4). It is clear that these two family trees are in substantial accord as regards their main conclusions, but that they show some variability in details. This condition reflects the present state of knowledge. All experts are in accord as to certain basic principles; but it is impossible to find two authors who agree exactly in their understanding of the less important data.

9. Geological and Glacial Time

A remark should be made here as to the age of these ancestral forms. The record of life on earth, as known from the fossils in stratified rocks, is divided into four great periods. The earliest, the *Primary* or *Palæozoic,* comprises about two-thirds of the total lapse of geologic time. During the Palæozoic all the principal divisions of invertebrate animals came into existence, but of the vertebrates only the fishes. In the *Secondary* or *Mesozoic* period, evolution progressed to the point where reptiles were the highest and dominant type, and the first feeble

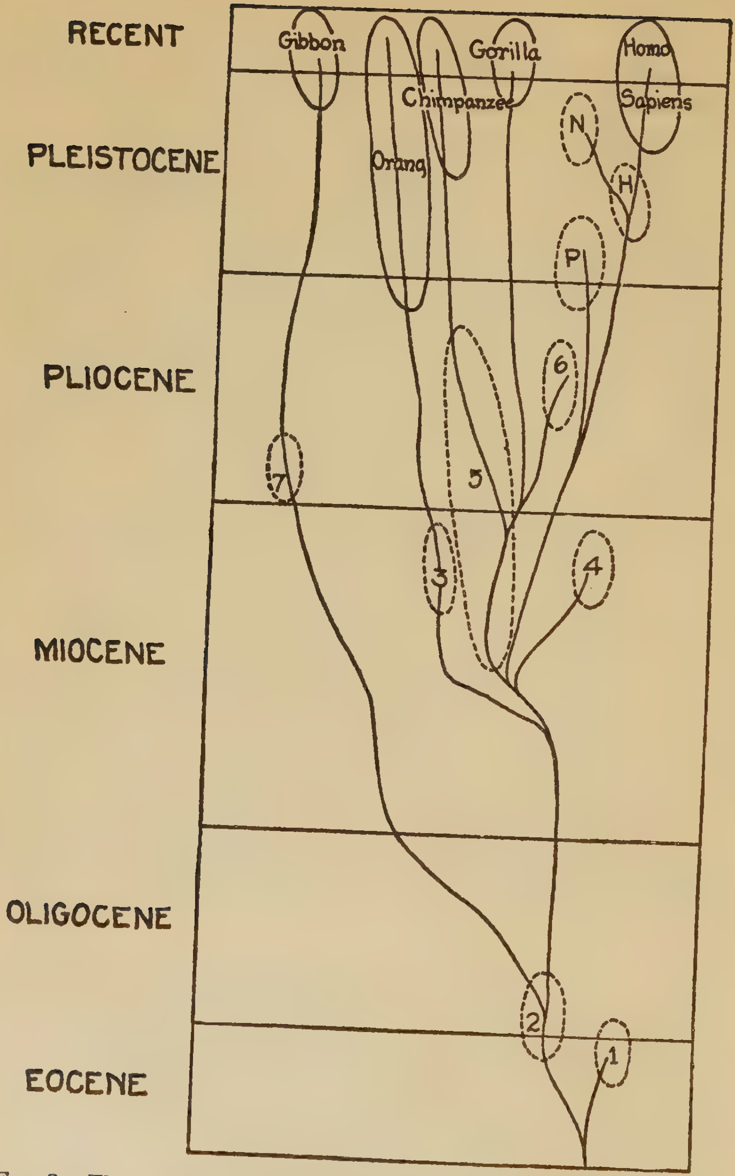

FIG. 3. The descent of man in detail, according to Gregory (somewhat simplified). Extinct forms: 1, Parapithecus; 2, Propliopithecus; 3, Palæosimia; 4, Sivapithecus; 5, Dryopithecus; 6, Palæopithecus; 7, Pliopithecus; P, Pithecanthropus erectus; H, Homo Heidelbergensis; N, Homo Neandertalensis.

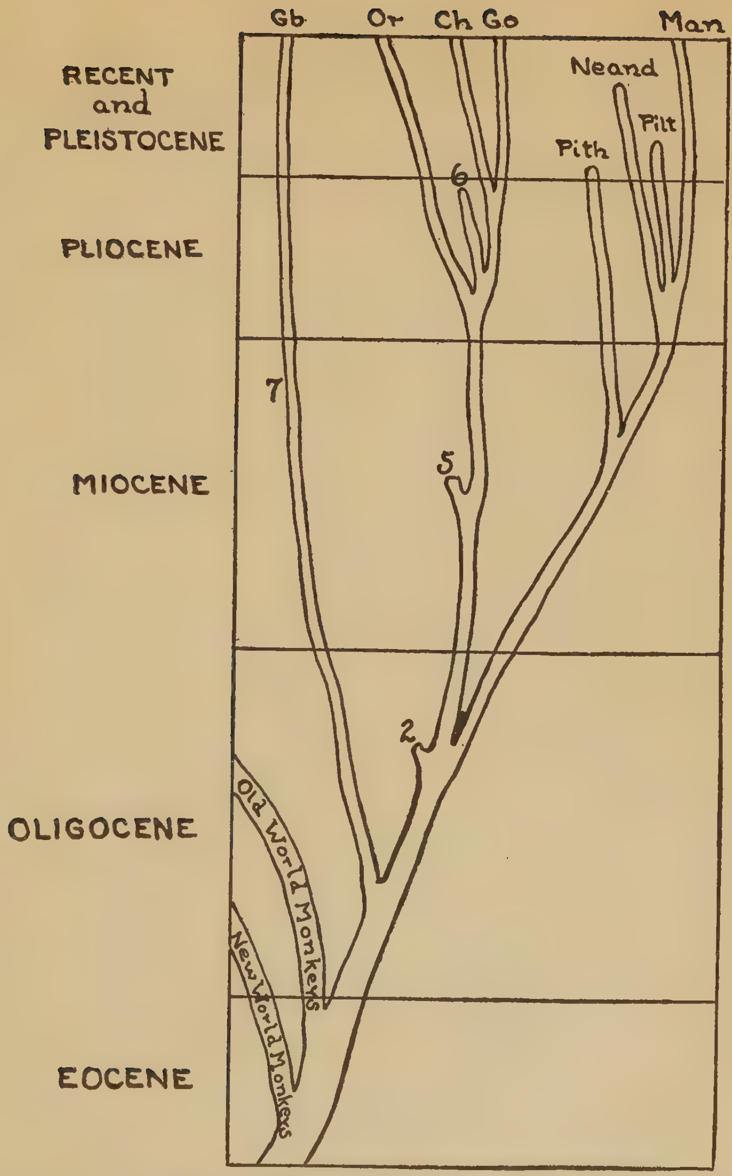

FIG. 4. The descent of man in detail, according to Keith (somewhat simplified). Extinct forms: 2, 5, 6, 7 as in Figure 3; Pith(ecanthropus), Pilt(down), Neand(ertal). Living forms: Gb, Or, Ch, Go, the anthropoid apes as in Figure 3.

bird and mammal forms appeared. The Mesozoic embraces most of the remaining third or so of the duration of life on the earth, leaving only something like five million years for the last two periods combined, as against thirty, fifty, ninety, or four hundred million years that the Palæozoic and Mesozoic are variously estimated to have lasted.

These last five million years or so of the earth's history are divided unequally between the *Tertiary* or Age of Mammals, and the *Quaternary* or Age of Man. About four million years are usually assigned to the Tertiary with its subdivisions, the Eocene, Oligocene, Miocene, and Pliocene. The Quaternary was formerly reckoned by geologists to have lasted only about a hundred thousand years. Later this estimate was raised to four or five hundred thousand, and at present the prevailing opinion tends to put it at about a million years. There are to be recognized, then, a four million year Age of Mammals before man, or even any definitely pre-human form, had appeared; and a final period of about a million years during which man gradually assumed his present bodily and mental type. In this Quaternary period fall all the forms which are treated in the following pages.

The Quaternary is usually subdivided into two periods, the Pleistocene and the Recent. The Recent is very short, perhaps not more than ten thousand years. It represents, geologically speaking, the mere instant which has elapsed since the final disappearance of the great glaciers. It is but little longer than historic time; and throughout the Recent there are encountered only modern forms of man. Back of it, the much longer Pleistocene is often described as the Ice Age or Glacial Epoch; and both in Europe and North America careful research has succeeded in demonstrating four successive periods of increase of the ice. In Europe these are generally known as the Günz, Mindel, Riss, and Würm glaciations. The probable American equivalents are the Nebraskan, Kansan, Illinoian, and Wisconsin periods of ice spread. Between each of these four came a warmer period when the ice melted and its sheets receded. These are the "interglacial periods" and are designated as the first, second, and third. These glacial and interglacial periods are of importance because they offer a natural chronology or time scale for the Pleistocene, and usually provide the best means of dating the fossil human types that have been or may hereafter be discovered (Fig. 5).

10. Place of Man's Origin and Development

Before we proceed to the fossil finds themselves, we must note that the greater part of the surface of the earth has been very imperfectly explored. Africa, Asia, and Australia may quite conceivably contain untold scientific treasures which have not yet been excavated. One cannot assert that they are lying in the soil or rocks of these continents; but one also cannot affirm that they are not there. North and South America have been somewhat more carefully examined, at least in certain of their areas, but with such regularly negative results that the prevailing opinion now is that these two continents—possibly through being shut off by oceans or ice masses from the eastern hemisphere—were not inhabited by man during the Pleistocene. The origin of the human species cannot then be sought in the western hemisphere. This substantially leaves Europe as the one continent in which excavations have been carried on with prospects of success; and it is in the more thoroughly explored western half of Europe that all but two of the unquestioned discoveries of ancient man have been made. One of these exceptional finds is from Africa. The other happens to be the one that dates earliest of all—the same Pithecanthropus already mentioned as being the closest known approach to the "missing link." Pithecanthropus was found in Java.

Now it might conceivably prove true that man originated in Europe and that this is the reason that the discoveries of his most ancient remains have to date been so largely confined to that continent. On the other hand, it does seem much more reasonable to believe that this smallest of the continents, with its temperate or cold climate, and its poverty of ancient and modern species of monkeys, is likely not to have been the true home, or at any rate not the only home, of the human family. The safest statement of the case would be that it is not known in what part of the earth man originated; that next to nothing is known of the history of his development on most of the con-

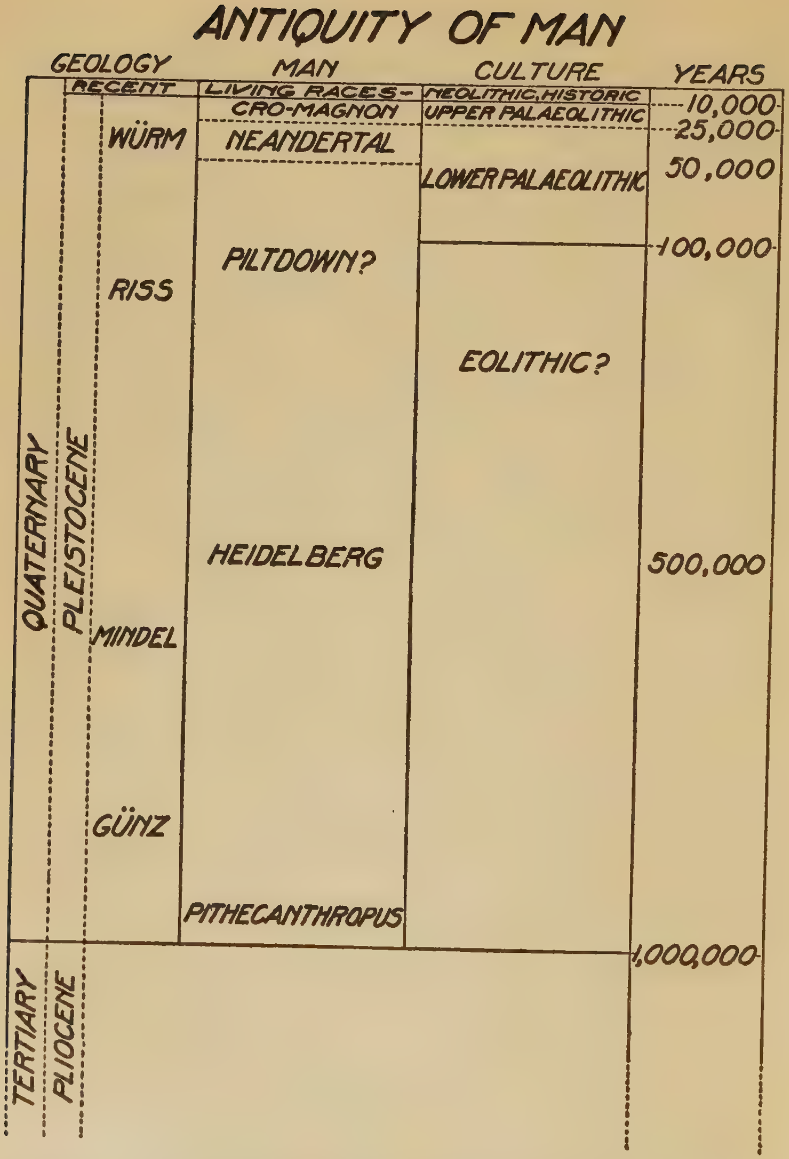

Fig. 5. Antiquity of man. This diagram is drawn to scale, proportionate to the number of years estimated to have elapsed, as far down as 100,000. Beyond, the scale is one-half, to bring the diagram within the limits of the page.

tinents; and that that portion of his history which chiefly is known is the fragment which happened to take place in Europe.

11. PITHECANTHROPUS

Pithecanthropus erectus, the "erect ape-man," was determined from the top part of a skull, a thigh bone, and two molar teeth found in 1891 under fifty feet of strata by Dubois, a Dutch surgeon, near Trinil, in the East Indian island of Java. The skull and the thigh lay some distance apart but at the same level and probably are from the same individual. The period of the stratum is generally considered early Pleistocene, possibly approximately contemporary with the first or Günz glaciation of Europe—nearly a million years ago, by the time scale here followed. Java was then a part of the mainland of Asia.

The skull is low, with narrow receding forehead and heavy ridges of bone above the eye sockets—"supraorbital ridges." The capacity is estimated at 850 or 900 cubic centimeters—half as much again as that of a large gorilla, but nearly one-half less than the average for modern man. The skull is dolichocephalic—long for its breadth—like the skulls of all early fossil men; whereas the anthropoid apes are more broad-headed. The jaws are believed to have projected almost like a snout; but as they remain undiscovered, this part of the reconstruction is conjectural. The thigh bone is remarkably straight, indicating habitual upright posture; its length suggests that the total body stature was about 5 feet 7 inches, or as much as the height of most Europeans.

Pithecanthropus was a terrestrial and not an arboreal form. He seems to have been slightly more similar to modern man than to any ape, and is the most primitive manlike type yet discovered. But he is very different from both man and the apes, as his name indicates: *Pithecanthropus* is a distinct genus, not included in *Homo,* or man.

12. HEIDELBERG MAN

Knowledge of Heidelberg man rests on a single piece of bone—a lower jaw found in 1907 by Schoetensack at a depth of nearly eighty feet in the Mauer sands not far from Heidelberg, Germany. Like the Pithecanthropus remains, the Heidelberg specimen lay in association with fossils of extinct mammals, a fact which makes possible its dating. It probably belongs to the second interglacial period, so that its antiquity is only about half as great as that of Pithecanthropus (Fig. 5).

The jaw is larger and heavier than any modern human jaw. The ramus, or upright part toward the socket, is enormously broad, as in the anthropoid apes. The chin is completely lacking; but this area does not recede so much as in the apes. Heidelberg man's mouth region must have projected considerably more than that of modern man, but much less than that of a gorilla or a chimpanzee. The contour of the jaw as seen from above is human (oval), not simian (narrow and oblong).

The teeth, although large, are essentially human. They are set close together, with their tops flush, as in man; the canines lack the tusk-like character which they retain in the apes.

Since the skull and the limb bones of this form are wholly unknown, it is somewhat difficult to picture the type as it appeared in life. But the jaw being as manlike as it is apelike, and the teeth distinctly human, the Heidelberg type is to be regarded as very much nearer to modern man than to the ape, or as farther along the line of evolutionary development than Pithecanthropus; as might be expected from its greater recency. This relationship is expressed by the name, *Homo Heidelbergensis,* which recognizes the type as belonging to the genus man.

13. The Piltdown Form

This form is reconstructed from several fragments of a female brain case, some small portions of the face, nearly half the lower jaw, and a number of teeth, found in 1911-13 by Dawson and Woodward in a gravel layer at Piltdown in Sussex, England. Great importance has been ascribed to this skull, but too many of its features remain uncertain to render it safe to build large conclusions upon the discovery. The age cannot be fixed with positiveness; the deposit is only a few feet below the surface, and in the open; the associated fossils have been washed or rolled into the layer; some of them are certainly much older than the skull, belonging to animals characteristic of the Pliocene, that is, the Tertiary. If the age of the skull was the third interglacial period, as on the whole seems most likely, its antiquity might be less than a fourth that of Pithecanthropus and half that of Heidelberg man.

The skull capacity has been variously estimated at 1,170, nearly 1,300, and nearly 1,500 c.c.; the pieces do not join, so that no certain proof can be given for any figure. Except for unusual thickness of the bone, the skull is not particularly primitive. The jaw and the teeth, on the other hand, are scarcely distinguishable from those of a chimpanzee. They are certainly far less human than the Heidelberg jaw and teeth, which are presumably earlier. This human skull and simian jaw are an almost incompatible combination. More than one expert has got over the difficulty by assuming that the skull of a contemporary human being and the jaw of a chimpanzee happened to be deposited in the same gravel.

In view of these doubts and discrepancies, the claim that the Piltdown form belongs to a genus *Eoanthropus* distinct from that of man is to be viewed with reserve. This interpretation would make the Piltdown type more primitive than the probably antecedent Heidelberg man. Some authorities do regard it as both more primitive and earlier.

14. Neandertal Man

The preceding forms are each known only from partial fragments of the bones of a single individual. The Neandertal race is substantiated by some dozens of different finds, including half a dozen nearly complete skulls, and several skeletons of which the greater portions have been preserved. These fossils come from Spain, France, Belgium, Germany, and what was Austro-Hungary, or, roughly, from the whole western half of Europe. They are all of similar type and from the Mousterian period of the Palæolithic or Old Stone Age (§ 70-72, Fig. 17); whereas Pithecanthropus, Heidelberg, and perhaps Piltdown are earlier than the Stone Age. The Mousterian period may be dated as coincident with the peak of the last or Würm glaciation, that is, about 50,000 to 25,000 years ago. Its race—the Neandertal type

—was clearly though primitively human; which fact is reflected in the various systematic names that have been given it: *Homo Neandertalensis*, *Homo Mousteriensis*, or *Homo primigenius*.

THE MOST IMPORTANT NEANDERTAL DISCOVERIES

1856	Neandertal	Near Düsseldorf, Germany	Skull cap and parts of skeleton
1848	Gibraltar	Spain	Greater part of skull
1887	Spy I	Belgium	Skull and parts of skeleton
1887	Spy II	Belgium	Skull and parts of skeleton
1889-1905	Krapina	Moravia	Parts of ten or more skulls and skeletons
1908	La-Chapelle-aux-Saints	Corrèze, France	Skeleton including skull
1908	Le Moustier	Dordogne, France	Skeleton, including skull, of youth
1909	La Ferrassie I	Dordogne, France	Partial skeleton
1910	La Ferrassie II	Dordogne, France	Skeleton
1911	La Quina	Charente, France	Skull and parts of skeleton
1911	Jersey	Island in English Channel	Teeth

Neandertal man was short: around 5 feet 3 inches for men, 4 feet 10 inches for women, or about the same as the modern Japanese. A definite curvature of his thigh bone indicates a knee habitually somewhat bent, and probably a slightly stooping or slouching attitude. All his bones are thickset: his musculature must have been powerful. The chest was large, the neck bull-like, the head hung forward upon it. This head was massive: its capacity averaged around 1,550 c.c., or equal to that of European whites and greater than the mean of all living races of mankind (Fig. 6). The head was rather low and the forehead sloped back. The supraorbital ridges were heavy: the eyes peered out from under beetling brows. The jaws were prognathous, though not more than in many Australians and Negroes; the chin receded but existed.

SOME NEANDERTAL MEASUREMENTS

Fossil	*Skull Capacity*	*Stature*
Neandertal	1400 c.c.	5 ft. 4 (or 1) in.
Spy I	1550 c.c.	5 ft. 4 in.
Spy II	1700 c.c.	
La Chapelle-aux-Saints	1600 c.c.	5 ft. 3 (or 2) in.
La Ferrassie I		5 ft. 5 in.
Average of male Neandertals	1550 c.c.	5 ft. 4 (or 3) in.
Average of modern European males	1550 c.c.	5 ft. 5 to 8 in.
Average—modern mankind	1450 c.c.	5 ft. 5 in.
Gibraltar	1300 c.c.	
La Quina	1350 c.c.	
La Ferrassie II		4 ft. 10 in.
Average of modern European females	1400 c.c.	5 ft. 1 to 3 in.

The artifacts found in Mousterian deposits show that Neandertal man chipped flint tools in several ways, knew fire, and buried his dead. It may be assumed as almost certain that he spoke some sort of language.

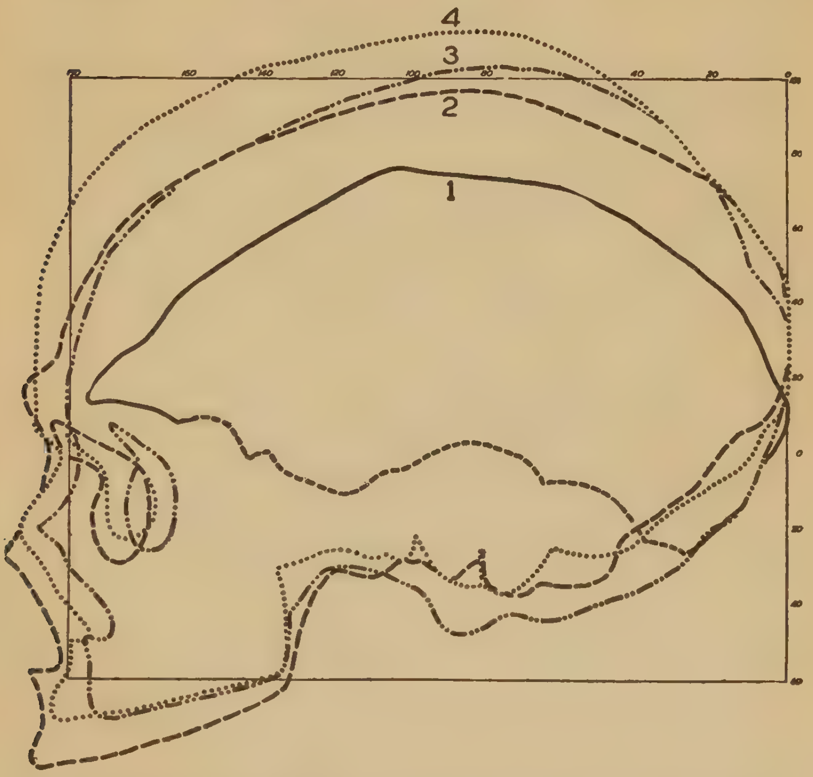

Fig. 6. Skulls of 1, Pithecanthropus; 2, Neandertal man (Chapelle-aux-Saints); 3, Sixth Dynasty Egyptian; 4, Old Man of Cro-Magnon. Combined from Keith. The relatively close approximation of Neandertal man to recent man, and the full frontal development of the Cro-Magnon race, are evident.

15. Rhodesian Man

Quite recent is the discovery of an African fossil man. This occurred in 1921 at Broken Hill Bone Cave in northern Rhodesia. A nearly complete skull was found, though without lower jaw; a small piece of the upper jaw of a second individual; and several other bones, including a tibia. The remains were ninety feet deep in a cave, associated with vast quantities of mineralized animal bones. Their age however is unknown. The associated fauna is one of living species only; but this does not imply the same recency as in Europe, since the animal life of Africa has altered relatively little since well back in the Pleistocene.

Measurements of Rhodesian man have not yet been published. The available descriptions point to a small brain case with low vault in the frontal region; more extremely developed eyebrow ridges than in any living or fossil race of man, including Pithecanthropus; a large gorilla-like face, with marked prognathism and a long stretch between nose and teeth—the area covered by the upper lip; a flaring but probably fairly prominent nose; an enormous palate and dental arch—too large to accommodate even the massive Heidelberg jaw; large teeth, but without the projecting canines of the apes and of the lower jaw attributed to Piltdown man; and a forward position of the foramen magnum—the aperture by which the spinal cord enters the brain—which suggests a fully upright position. The same inference is derivable from the long, straight shin-bone.

On the whole, this seems to be a form most closely allied to Neandertal man, though differing from him in numerous respects, and especially in the more primitive type of face. It is well to remember, however, that of none of the forms anterior to Neandertal man—Pithecanthropus, Heidelberg, Piltdown—has the face been recovered. If these were known, the Rhodesian face might seem less impressively ape-like. It is also important to observe that relatively primitive and advanced features exist side by side in Rhodesian man; the face and eyebrow ridges are somewhat off-set by the prominent nose, erect posture, and long clean limb bones. It is therefore likely that this form was a collateral relative of Neandertal man rather than his ancestor or descendant. Its place in the history of the human species can probably be fixed only after the age of the bones is determined. Yet it is already clear that the discovery is important in at least three respects. It reveals the most ape-like face yet found in a human variety; it extends the record of fossil man to a new continent; and that continent is the home of the two living apes—the gorilla and chimpanzee—recognized as most similar to man.

16. The Cro-Magnon Race

The Cro-Magnon race is not only within the human species, but possibly among the ancestors of modern Europeans. While Neandertal man is still *Homo Neandertalensis*—the genus of living man, but a different species—the Cro-Magnon type is *Homo sapiens*—that is, a variety of ourselves. The age is that of the gradual, fluctuating retreat of the glaciers—the later Cave period of the Old Stone Age: the Upper Palæolithic, in technical language, comprising the Aurignacian, the Solutrean, and the Magdalenian (§ 70). In years, this was the time from 25,000 to 10,000 B.C.

Some Important Remains of Cro-Magnon Type

		Aurignacian	
1868	Cro-Magnon	Dordogne, France	5 incomplete skeletons
1872-74	Grimaldi	Mentone, N.W. Italy	12 skeletons
1909	Laugerie Haute	Dordogne, France	Skeleton
1909	Combe-Capelle	Périgord, France	Skeleton
		Magdalenian	
1872	Laugerie Basse	Dordogne, France	Skeleton
1888	Chancelade	Dordogne, France	Skeleton, nearly complete
1914	Obercassel	Near Bonn, Germany	2 skeletons

The Cro-Magnon race of Aurignacian times, as represented by the finds at Cro-Magnon and Grimaldi,[1] was excessively tall and large-brained, surpassing any living race of man in both respects.

The adult male buried at Cro-Magnon measured 5 feet 11 inches in life; five men at Grimaldi measured from 5 feet 10½ inches to 6 feet 4½ inches, averaging 6 feet 1½ inches. The tallest men now on earth, certain Scots and Negroes, average less than 5 feet 11 inches. A girl at Grimaldi measured 5 feet 5 inches. This race was not only tall, but clean-limbed, lithe, and swift.

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[1] The place or "station" Grimaldi must not be confused with the Grimaldi race mentioned below. The grottos at Grimaldi contained two skeletons of Grimaldi racial type and a larger number of Cro-Magnon type. The Grimaldi race is therefore really not the most representative one of the locality Grimaldi; but as it has not yet been discovered elsewhere, there seems no choice but to call it by that name.

Their brains were equally large. Those of the five male skulls from Grimaldi contain from over 1,700 to nearly 1,900 c.c.—an average of 1,800 c.c.; that of the old man of Cro-Magnon, nearly 1,600 c.c.; of a woman there, 1,550 c.c. If these individuals were not exceptional, the figures mean that the size and weight of the brain of the early Cro-Magnon people was some fifteen or twenty per cent greater than that of modern Europeans.

The cephalic index is low—that is, the skull was long and narrow, as in all the types here considered; but the face was particularly broad. The forehead rose well domed; the supraorbital development was moderate, as in recent men; the features must have been attractive even by our standards.

Three of the best preserved skeletons of the Magdalenian period are those of women. Their statures run 4 feet 7 inches, 5 feet 1 inch, 5 feet 1 inch, which would indicate a corresponding normal height for men not far from that of the average European of to-day. The male from Obercassel attained a stature of about 5 feet 3 inches, a cranial capacity of 1,500 c.c., and combined a long skull with a wide face. The general type of the Magdalenian period might be described as a reduced Cro-Magnon one.

The Cro-Magnon peoples used skilfully made harpoons, originated a remarkable art, and in general attained a development of industries parallel to their high degree of bodily progress.

17. The Brünn Race

Several remains have been found in central Europe which have sometimes been considered as belonging to the Neandertal race and sometimes to the subsequent Cro-Magnon race, but do not belong clearly with either, and may perhaps be regarded as distinct from both and possibly bridging them. The type is generally known as the Brünn race. Its habitat was Czecho-Slovakia and perhaps adjacent districts; its epoch, postglacial, in the Solutrean period of the Upper Palæolithic (§ 70). The Brünn race, so far as present knowledge of it goes, was therefore both preceded and succeeded by Cro-Magnon man.

1871	Brüx	Bohemia	Skull cap
1880	Predmost	Moravia	Parts of 20 skeletons
1891	Brünn	Moravia	Skeleton, 2 skulls

The Brünn race belongs with modern man: its species is no longer *Homo Neandertalensis,* but *Homo sapiens,* to which we also belong. The heavy supraorbital ridges of the earlier type are now divided by a depression over the nose instead of stretching continuously across the forehead; the chin is becoming pronounced, the jaws protrude less than in Neandertal man. The skull is somewhat higher and better vaulted. In all these respects there is an approach to the Cro-Magnon race. But the distinctively broad face of the Cro-Magnon people is not in evidence.

A skull of uncertain geologic age, found in 1888 at Galley Hill, near London, is by some linked with the Brünn race. The same is true of an unusually well preserved skeleton found in 1909 at Combe-Capelle, in Périgord, southern France. The period of the Combe-Capelle skeleton is Upper Palæolithic Aurignacian. This was part of the era of the Cro-Magnon race in western Europe; and as the Combe-Capelle remains do not differ much from the Cro-Magnon type, they are best considered as belonging to it.

18. THE GRIMALDI RACE: NEOLITHIC RACES

The Grimaldi race is to date represented by only two skeletons, those of a woman and a youth—possibly mother and son—found in 1906 in a grotto at Grimaldi near Mentone, in Italy, close to the French border. They reposed in lower layers, above which subsequent Cro-Magnon burials of Aurignacian date had been made. Their age is therefore early Aurignacian: the beginning of the Upper Palæolithic or later Cave period of the Old Stone Age. The statures are 5 feet 2 inches and 5 feet 1 inch—the youth was not fully grown; the skull capacities 1,375 and nearly 1,600 c.c.

The outstanding feature of both skeletons is that they bear a number of Negroid characteristics. The forearm and lower leg are long as compared with the upper arm and thigh; the pelvis high and small; the jaws prognathous, the nose flat, the eye orbits narrow. All these are Negro traits. This is important, in view of the fact that all the other ancient fossils of men are either more primitive than the living races or, like Cro-Magnon, perhaps ancestral to the Caucasian race.

No fossil remains of any ancestral Mongolian type have yet been discovered.

The New Stone Age, beginning about 10,000 or 8,000 B.C., brings the Grenelle and other types of man; but these are so essentially modern that they need not be considered here. In the Neolithic period, broad heads are for the first time encountered, as they occur at present in Europe and other continents, alongside of narrow ones. The virtual fixity of the human type for these last ten thousand years is by no means incredible. Egyptian mummies and skeletons prove that the type of that country has changed little in five thousand years except as the result of invasions and admixture.

19. The Metric Expression of Human Evolution

The relations of the several fossil types of man and their gradual progression are most accurately expressed by certain skull angles and proportions, or indexes, which have been specially devised for the purpose. The anthropometric criteria that are of most importance in the study of living races, more or less fail in regard to prehistoric man. The hair, complexion, and eye-color are not preserved. The head breadth, as indicated by the cephalic index, is substantially the same from Pithecanthropus to the last Cro-Magnons. Stature on the other hand varies from one to another ancient race without evincing much tendency to grow or to diminish consistently. Often, too, there is only part of a skull preserved. The following proportions of the top or vault of the skull—the calvarium—are therefore useful for expressing quantitatively the gradual physical progress of humanity from its beginning.

Three anatomical points on the surface of the skull are the pivots on which these special indexes and angles rest. One is the *Glabella* (G in figure 7), the slight swelling situated between the eyebrows and above the root of the nose. The second is the *Inion* (I), the most rearward point on the skull. The third is the *Bregma* (B) or point of intersection of the sutures which divide the frontal from the parietal bones. The bregma falls at or very near the highest point of the skull.

If now we see a skull lengthwise, or draw a projection of it, and connect the glabella and the inion by a line GI, and the glabella and the bregma by a line GB, an acute angle, BGI, is formed. This is the "bregma angle." Obviously a high vaulted skull or one that has the superior point B well forward will show a greater angle than a low flat skull or one with its summit lying far back.

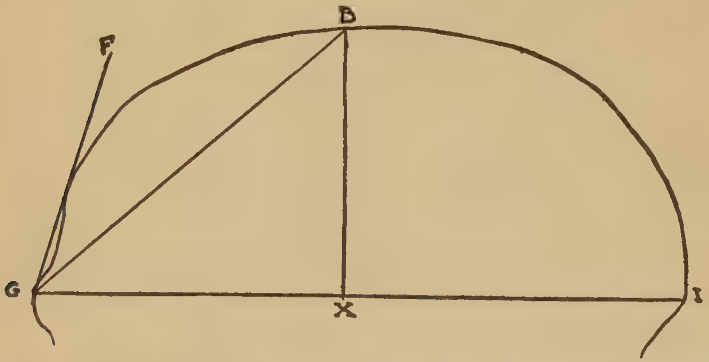

FIG. 7. Indices and angles of special significance in the change from fossil to living man. Calvarial height index, *BX: GI*. Bregma position index, *GX: GI*. Bregma angle, *BGI*. Frontal angle, *FGI*.

Next, let us drop a vertical from the bregma to the line GI, cutting it at X. Obviously the proportion which the vertical line BX bears to the horizontal line GI will be greater or less as the arch or vault of the brain case is higher or lower. This proportion BX:GI, expressed in percentages, is the "calvarial height index."

If now we compute the proportion of the GX part of the line GI to the whole of this line, we have the "bregma position index"; that is, a numerical indication of how far forward on

THE SKULL OF MODERN AND FOSSIL MAN

	Calvarial Height Index	*Bregma Angle*	*Bregma Position Index*	*Frontal Angle*
Maximum for modern man	68	66	..	..
Average for modern man	59	58	30.5	90
90 Central Europeans	60	61	31	..
28 Bantu Negroes	59	59	31	..
7 Greenland Eskimos	56	58	30	..
43 Australian natives	56	57.5	(33)	..
8 Tasmanian natives	56	57	..	..
Minimum for modern man	47.5	46	37	72
Chancelade	57	60	..	..
Combe-Capelle	54.5	58	..	..
Aurignac	54.5	..	..	..
Cro-Magnon I	50	54	33	..
Brünn I	51	52	..	75
Galley Hill	48	52	..	82
Brüx	48	51 ?	..	75 ?
Le Moustier	47	..	..	..
Krapina C	46	52	..	70
Spy II	44	50	35	67
Krapina D	42	50	32	66
Chapelle-aux-Saints	40.5	45.5	36.5	65
Spy I	41	45	35	57.5
Gibraltar	40	50	..	73 ?
Neandertal	40	44	38	62
Pithecanthropus	34	38	42	52.5
Maximum for any Anthropoid ape	38	39.5	63	..
Chimpanzee	32	34	47	56
Gorilla	20	22	42	..
Orang-utan	27	32	45	..

SUMMARIZED AVERAGES

Modern races	59	58	31	90
Cro-Magnon race	54	57	33	..
Brünn race	49	52	..	77
Neandertal man	42	48	35	66
Pithecanthropus	34	38	42	52
Anthropoid apes	26	30	45	..

the skull the highest point B lies. A sloping or retreating forehead naturally tends to have the bregma rearward; whereas if the frontal bone is nearly vertical, resulting in a high, domed expanse of forehead, the bregma tends to be situated farther forward, the point X shifts in the same direction, the distance GX becomes shorter in comparison to the whole line GI, and the "bregma position index" falls numerically.

The "frontal angle," finally, is determined by drawing a line GF from the glabella tangent to the most protruding part of the frontal bone and measuring the angle between this and the horizontal GI. A small frontal angle obviously means a receding forehead.

All these data can be obtained from the mere upper fragment of a skull; they relate to that feature which is probably of the greatest importance in the evolution of man from the lower animals—the development of the brain case and therefore of the brain, especially of the cerebrum or fore-brain; and they define this evolution rather convincingly. The table, which compiles some of the most important findings, shows that progress has been fairly steadily continuous in the direction of greater cerebral development.

CHAPTER III

LIVING RACES

20. Race origins.—21. Race classification.—22. Traits on which classification rests.—23. The grand divisions or primary stocks.—24. Caucasian races.—25. Mongoloid races.—26. Negroid races.—27. Peoples of doubtful position.—28. Continents and oceans.—29. The history of race classifications.—30. Emergence of the threefold classification.—31. Other classifications.—32. Principles and conclusions common to all classifications.—33. Race, nationality, and language.

20. Race Origins

Almost every one sooner or later becomes interested in the problem of the origin of the human races and the history of their development. We see mankind divided into a number of varieties that differ strikingly in appearance. If these varieties are modifications of a single ancestral form, what caused them to alter, and what has been the history of the change?

In the present state of science, we cannot wholly answer these important questions. We know very little about the causes that change human types; and we possess only incomplete information as to the history of races. Stray bits of evidence here and there are too scattered to afford many helpful clues. The very earliest men, as we know them from fossils, are too far removed from any of the living varieties, are too primitive, to link very definitely with the existing races, which can all be regarded as intergrading varieties of a single species, *Homo sapiens*. In the latter half of the Old Stone Age, in the Aurignacian period, at a time estimated to have been from twenty to twenty-five thousand years ago, we commence to encounter fossils which seem to foreshadow the modern races. The so-called Grimaldi type of man from this period possesses Negroid affinities, the contemporary Cro-Magnon and perhaps Brünn types evince Caucasian ones. But we know neither the origin nor the precise descendants of these fossil races.[1] They appear and then vanish from the scene. About all that we can conclude from this fragment of evidence is that the races of man as they are spread over the earth to-day must have been at least some tens of thousands of years in forming. What caused them to differentiate, on which part of the earth's surface each took on its peculiarities, how they further subdivided, what were the connecting links between them, and what happened to these lost links—on all these points the answer of anthropology is as yet incomplete.

It is no different in other fields of biology. As long as the zoölogist or botanist reviews his grand classifications or the wide sweep of organic evolution for fifty million years back, he seems to obtain striking and simple results. When he turns his attention to a small group, attempting to trace in detail its subvarieties, and the relations and history of these, the task is seen to be intricate and the accumulated knowledge is usually insufficient to solve more than a fraction of the problems that arise.

There is, then, nothing unusual in the situation of partial bafflement in which anthropology still finds itself as regards the human races.

21. Race Classification

What remains is the possibility of making an accurate survey of the living races in the hope that the relationships which a classification brings out may indicate something as to the former development of the races. If for instance it could be established that the Ainu or aborigines of Japan are closely similar in their bodies to the peoples of Europe, we would then infer that they are a branch of the Caucasian stock, that their origin took place far to the west of their present habitat, and that they have no connection with the Mongolian Japanese among whom they now live. This is working by indirect evidence, it is true; but sooner or later that is the method to which science always finds itself reduced.

The desirability of a trustworthy classification of the human races will therefore be generally accepted without further argument. But the making of such a classification proves to be more difficult than might be imagined. To begin with, a race is only a sort of average of a large number of individuals; and averages differ from one another much less than individuals. Popular impression exaggerates the differences, accurate measurements reduce them. It is true that a Negro and a north European cannot possibly be confused: they happen to represent extreme types. Yet as soon as we operate with less divergent races we find that variations between individuals of the same race are often greater than differences between the races. The tallest individuals of a short race are taller than the shortest individuals of a tall race. This is called *overlapping;* and it occurs to such an extent as to make it frequently difficult for the physical anthropologist to establish clear-cut types.

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[1] It has been maintained that individuals of Cro-Magnon type can still be found in southern France and reckoned as a distinct element in the population of certain districts; but the Cro-Magnon race as such has disappeared.

In addition, the lines of demarcation between races have time and again been obliterated by interbreeding. Adjacent peoples, even hostile ones, intermarry. The number of marriages in one generation may be small; but the cumulative effect of a thousand years is often quite disconcerting. The half-breeds or hybrids are also as fertile as each of the original types. There is no question but that some populations are nothing but the product of such race crossing. Thus there is a belt extending across the entire breadth of Africa of which it is difficult to say whether the inhabitants belong to the Negro or to the Caucasian type. If we construct a racial map and represent the demarcation between Negro and Caucasian by a line, we are really misrepresenting the situation. The truth could be expressed only by inserting a transition zone of mixed color. Yet as soon as we allow such transitions, the definiteness of our classification begins to crumble.

In spite of these difficulties, some general truths can be discovered from a careful race classification, and certain constant principles of importance emerge from all the diversity.

22. TRAITS ON WHICH CLASSIFICATION RESTS

Since every human being obviously possesses a large number of physical features or traits, the first thing that the prospective classifier of race must do is to determine how much weight he will attach to each of these features.

The most striking of all traits probably is *stature* or bodily height. Yet this is a trait which experience has shown to be of relatively limited value for classificatory purposes. The imagination is easily impressed by a few inches when they show at the top of a man and make him half a head taller or shorter than oneself. Except for a few groups which numerically are rather insignificant, there is no human race that averages less than 5 feet in height. There is none at all that averages taller than 5 feet 10 inches. This means that practically the whole range of human variability in height, from the race standpoint, falls within less than a foot. The majority of averages of populations do not differ more than 2 inches from the general human average of 5 feet 5 inches.

Then, too, stature has been proved to be rather readily influenced by environment. Each of us is a fraction of an inch taller when he gets up in the morning than when he goes to bed at night. Two races might differ by as much as a couple of inches in their heredity, and yet if all the individuals of the shorter race were well nourished in a favorable environment, and all those of the taller group were underfed and overworked, the naturally shorter race might well be actually the taller one.

The *cephalic index,* which expresses in percentage form the ratio of the length and the breadth of the head, is perhaps the most commonly used anthropological measurement.[1] It has certain definite advantages. The head measurements are easily made with accuracy. The index is nearly the same on the living head and on the dead skull; or one is easily converted into the other. This enables present and past generations to be compared. The index is also virtually the same for men and for women, for children and for adults. Finally, it seems to be little affected by environment. The consequence is that head form has been widely investigated. There are few groups of people of consequence whose average cephalic index we do not know fairly accurately. The difficulty about the cephalic index from the point of view of race classification is that it does not yield broad enough results. This index is often useful in distinguishing subtypes, nation from nation, or tribe from tribe; but the primary races are not uniform. There is, for instance, no typical head form for the Caucasian race. There are narrow headed, medium headed, and broad headed Caucasians. The same is true of the American Indians, who are on the whole rather uniform, yet vary much in head form.

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[1] The usual nomenclature for cephalic index is on the basis of round numbers: broad or round headed or brachycephalic above 80; medium headed or mesocephalic between 75 and 80; narrow or long headed or dolichocephalic below 75. Yet, as the average for mankind is in the neighborhood of 79, this terminology makes far more brachycephalic than dolichocephalic peoples. Groups frequently spoken of as long headed are often really mesocephalic by the accepted definition: a large proportion of Europeans, for instance. It would result in both more accuracy and a better balancing of the limits if the three types of head form were set, as has been suggested, at 81 and 77 in place of 80 and 75.—The index of the skull (strictly, the cranial index) is two units less than that taken on the living head.

The *nasal index,* which expresses the relation of length and breadth of nose, runs much more constant in the great races. Practically all Negroids are broad-nosed, practically all Caucasians narrow-nosed, and the majority of peoples of Mongolian affinities medium-nosed. But the nasal index varies according to the age of the person; it is utterly different in a living individual and a skull;[1] it seems to reflect heredity less directly than the cephalic index; and finally it tells us nothing about the elevation or profile or general formation of the nose.

Prognathism, or the degree of the protrusion of the jaws, is a conspicuous feature of the profile, and would seem to be of some historic importance as a sign of primitiveness, because all other mammals are more prognathous than man. The trait also has a general correlation with the fundamental racial types. Negroes are almost all prognathous, people of Mongolian type moderately so, Caucasians very slightly. Prognathism is however difficult to measure or to denote in figures. Various apparatuses have been devised without wholly satisfactory results.

The *capacity of the skull* is measured by filling it with shot or millet seed. The latter yields figures that are lower by 50 or 100 c.c. The average, by shot measure, for males the world over is about 1,450 to 1,500 c.c., for females about 10 per cent lower. European males range from 1,500 to 1,600, Asiatic Mongoloids but little less, American Indians and Polynesians from 1,400 to 1,500, Bushmen, Australians, Tasmanians, Negritos, Veddas from 1,300 to 1,400. These last groups are all small bodied. It appears that cranial capacity is considerably dependent on bodily size. Slender as well as short races run to small capacities. The heavy Bantu surpass the slighter framed Sudanese, and Hindus stand well below European Caucasians; just as the shorter Japanese average less than the Chinese. Broad headed populations show greater cranial capacity than narrow headed ones: Alpine Europeans (§ 24) generally surpass Nordics in spite of their shorter stature. Individual variability is also unusually great in this measurement. The largest and smallest skulled healthy individuals of the same sex in one population differ sometimes by 500, 600, or 700 c.c., or more than one-third of the racial average. Overlapping between races is accordingly particularly marked in cranial capacity. Furthermore, the measurement obviously cannot be taken on the living. In spite of its interest as an alleged and perhaps partially valid index of mental faculty, cranial capacity is thus of restricted value in distinguishing races.

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[1] On the living, platyrhine noses have an index of breadth compared with length above 85, mesorhine between 70 and 85, leptorhine below 70; skeletally, the same three terms denote proportions above 53, between 48 and 53, and below 48.

The *texture of the hair* is now universally regarded as one of the most valuable criteria for classifying races, possibly the most significant of all. Hair is distinguished as woolly in the Negro, straight in the Mongolian, and wavy or intermediate in the Caucasian. This texture depends principally on the diameters of each individual hair, as they are revealed in cross-section under the microscope; in part also on the degree of straightness or curvature of the root sacs of the hair in the skin. Hair texture seems to run rather rigidly along hereditary racial lines, and to be uninfluenced by factors of age, sex, climate, or nourishment.

Hairiness of the body as a whole is another trait to which more and more attention is coming to be paid. The fullness or scantiness of the beard, and the degree of development of the down which covers the body, are its most conspicuous manifestations. Caucasians are definitely a hairy race, Mongoloids and most Negroids glabrous or smooth-skinned. It is largely on the basis of their hairiness that races like the Australians have been separated from the Negroids, and the Ainus from the Japanese.

Except possibly for stature, *color* is probably the most conspicuous trait of any race. Under color must be included the complexion of the skin, the color of the hair, and the color of the eyes. All of these however present difficulties to the anthropometrist. The pigment in every human skin is the same: it differs only in amount. We have therefore a complete series of transition shades, and it is difficult to express these differences of shade quantitatively. They readily impress the eye, but it is far from easy to denote them accurately in numbers. Environment also affects skin color markedly. A day's exposure to the sun will darken an individual's complexion by several shades. In spite of these drawbacks, however, complexion remains sufficiently important to have to be considered in every classification.

Hair color and eye color are practically immune against direct change by environment. They unquestionably are excellent hereditary criteria, although they offer much the same resistance to measurement as does complexion. The utility of these two traits is however limited by another factor: their narrow distribution. Blue eyes and blond hair are racially characteristic of only a single subrace, that of northern Europe. In central Europe they are already much toned down: the prevailing type here is brunet. In southern Europe, blue eyes and blondness scarcely occur at all except where admixture with northern peoples can be traced. Outside of the Caucasian stock, black hair and black eyes are the universal rule for the human family.

Obviously it would be easiest to arrive at a clear-cut classification by grouping all the peoples of the earth according to a single trait, such as the shape of the nose, or color. But any such classification must be artificial and largely unsound, just because it disregards the majority of traits. The only classification that can claim to rest upon a true or natural basis is one which takes into consideration as many traits as possible, and weights the important more heavily than the unimportant features. If the outcome of such a grouping is to leave some peoples intermediate or of doubtful place in the classification, this result is unfortunate but must be accepted.

RACIAL CLASSIFICATION OF MANKIND

Primary Stocks and Races	*Texture of Hair of Head*	*Hair of Body and Face*	*Head*	*Nose*	*Prognathism*	*Skin Color*	*Stature*	*Remarks*
CAUCASIAN OR “WHITE”								
Nordic	Wavy	Abundant	Narrow	Narrow	Slight	Very “white”	Tall	Hair blond, eyes light.
Alpine	“	“	Broad	“	“	White	Above aver.	Hair brown, eyes brown.
Mediterranean	“	“	Narrow	“	“	Dark white	Medium	
Hindu	“	“	“	Variable	Moderate	Brown	Above aver.	Probable Australoid admixture in South.
MONGOLOID OR “YELLOW”								
Mongolian	Straight	Slight	Broad	Medium	Medium	Light brown	Below aver.	“Mongolian” eye, broad face.
Malaysian	“	“	“	“	“	Brown	“ “	
American Indian	“	“	Variable	“	“	“	Tall to med.	Broad face.
NEGROID OR “BLACK”								
Negro	Woolly	Slight	Narrow	Broad	Strong	“Black”	Tall	
Melanesian	“	“	“	“	“	“	Medium	
Dwarf Black	“	“	Broad	“	Moderate	“	Very short	Bushmen show several special features.
OF DOUBTFUL CLASSIFICATION								
Australian	Wavy	Abundant	Narrow	Broad	Strong	Black	Above aver.	Negroid traits preponderate, some Caucasian resemblances.
Vedda, Irula, Kolarians, Moi, Senoi, Toala, etc.	“	Moderate	“	“	Medium	Dark brown	Short	Generalized pre-Caucasian with Australoid resemblances. “Indo-Australians.”
Polynesian	“	“	Variable	Medium	“	Brown	Tall	Perhaps Mongoloid with some Caucasian traits and local Negroid admixture.
Ainu	“	Abundant	Narrow	“	“	Light brown	Medium	A generalized Caucasian or divergent Mongoloid type.

Hair and eyes are “black” unless otherwise stated in Remarks.

23. THE GRAND DIVISIONS OR PRIMARY STOCKS

If now we follow this plan and review the peoples of the earth, each with reference to all its physical traits, we obtain an arrangement something like that which is given in the table on the previous page. It will be seen that there are three grand divisions, of which the European, the Negro, and the Chinaman may be taken as representative. These three primary classes are generally called Caucasian, Negroid, and Mongoloid. The color terms, White, Black, and Yellow, are also often used, but it is necessary to remember that they are employed merely as brief convenient labels, and that they have no descriptive value. There are millions of Caucasians who are darker in complexion than millions of Mongoloids.

These three main groups account for more than nine-tenths of all the nations and tribes of the world. As to the number of individuals, they comprise probably 99 per cent of all human beings. The aberrant forms are best kept separate. Some of them, like the before-mentioned Ainu and Australians, appear to affiliate preponderantly with one of the three great classes, but still differ sufficiently in one or more particulars to prevent their being included with them outright. Other groups, such as the Polynesians, seem to be, at least in part, the result of a mixture of races. Their constituent elements are so blended, and perhaps so far modified after the blending, as to be difficult to disentangle.

Each of the three great primary stocks falls into several natural subdivisions.

24. CAUCASIAN RACES

Three of the four Caucasian races live, in whole or part, in Europe; the fourth consists of the Hindus.[1] The three European races are the Nordic, the Alpine, and the Mediterranean. Some authorities recognize a greater number, but all admit at least these three. They occupy horizontal belts on the map. Beginning with the Nordic and ending with the Mediterranean they may be described as successively darker skinned, darker eyed, darker haired, and shorter in stature. The Alpine race, which lies between the two others, is however more than a mere transition; for it is broad headed, whereas the Nordic and Mediterranean are both narrow or long headed. The Nordic type is essentially distributed around the Baltic and North seas. The Mediterranean race occupies the shores of the Mediterranean Sea, in Asia and Africa as well as in Europe. In ancient times it seems to have prevailed everywhere along these coasts. At present the Balkan peninsula and Asia Minor are mostly occupied by broad headed peoples of more or less close affinity to the Alpines. This Alpine race is perhaps less homogeneous than the two others. A central Frenchman, a Serb, a Russian, and an Armenian are clearly far from identical (§ 30). They have enough in common, however, to warrant their being put in the one larger group.

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[1] The distribution of the races is described as it existed before the era of exploration and colonization that began toward the end of the fifteenth century. Although for practical purposes they have been submerged by Caucasians in the greater part of the Americas, Australia, and South Africa, it is the native races whose distribution is referred to.

It must be clearly understood that these races have nothing to do with the modern political nationalities of Europe. Northern Germany is prevailingly Nordic, southern Germany, Alpine. Northern Italy is Alpine, the rest of the peninsula Mediterranean. All three races are definitely represented in France. The average north Frenchman stands racially nearer to the north German than to his countryman from central France, whereas the latter links up in physical type with the south German. Nationality is determined by speech, customs, religion, and political affiliations. Its boundary lines and those of race cut right across one another.

The British Isles did not escape the process of race blending that has gone on in Europe for thousands of years. The bulk of the blood of their inhabitants during the past thousand years has been Nordic, but there is an Alpine strain, and most authorities recognize a definite "Iberian," that is, Mediterranean element. The first settlers in America carried this mixture across the Atlantic, and through the years immigration has increased its compositeness. Scandinavians and north Germans have added to the Nordic component in the population of the United States; south Germans, Austro-Hungarians, Russians, and Jews to the Alpine; the Italians have injected a definite Mediterranean element. The Negro alone has not been admitted into the make-up of our white society; but the reverse holds: a considerable and growing percentage of the ''colored'' people in the United States are from one-sixteenth to fifteen-sixteenths Caucasian.

The Hindu is in the main a narrow headed, dark skinned Caucasian, not very different from the Mediterranean. When he entered India he probably found there an aboriginal population which may have been Negroid but more likely was related to the Australians or perhaps constituted a dark proto-Caucasian or Indo-Australian race. A fairly thorough intermixture has taken place in India during the last three thousand years, with the result that the originally pure Caucasian type of the Hindu has been somewhat modified, while most of the less numerous or less vigorous aboriginal population has become submerged. The definite Caucasian type is best preserved in the north; the traces of the dark skinned aboriginal race are strongest in southern India.

25. Mongoloid Races

The Mongoloid stock divides into the Mongolian proper of eastern Asia, the Malaysian of the East Indies, and the American Indian. The differences between these three types are not very great. The Mongolian proper is the most extreme or pronounced form. It was probably the latest to develop its present characteristics. For instance, the oblique or ''Mongolian'' eye is a peculiarity restricted to the people of eastern Asia. The original Mongoloid stock must be looked upon as having been more like present-day Malaysians or American Indians, or intermediate between them. From this generalized type peoples like the Chinese gradually diverged, adding the epicanthic fold of the oblique eye and other peculiarities, while the less civilized peoples of America and Oceania kept more nearly to the ancient type.

Within the East Indies, a more and a less specifically Mongoloid strain can at times be distinguished. The latter has often been called Indonesian. In certain respects, such as relatively short stature and broad nose, it approaches the Indo-Australian type described below. Among the American Mongoloids, the Eskimo appears to be the most particularized subvariety.

26. Negroid Races

The Negroid stock falls into two large divisions, the African Negro proper, and the Oceanic Melanesian; besides a third division, the Dwarf Blacks or Negritos, who are very few in numbers but possess a wide and irregular distribution. The Negroes and the Melanesians, in spite of their being separated by the breadth of the Indian Ocean, are clearly close relatives. A trained observer can distinguish them at sight, but a novice would take a Papuan from New Guinea or a Melanesian from the Solomon or Fiji Islands to be an African. Perhaps the most conspicuous difference is that the broad nose of the African Negro is flat, the broad nose of the Melanesian often aquiline. How these two so similar Negroid branches came to be located on the opposite sides of a great ocean is a fact that remains unexplained.

The Negrito or Dwarf Negroid race has representatives in New Guinea, in the Philippines, in the Malay Peninsula, in the Andaman Islands, and in equatorial Africa. These peoples are the true pygmies of the human species. Wherever they are racially pure the adult males are less than 5 feet in stature. They also differ from other Negroids in being relatively broad headed. Their skin color, hair texture, nose form, and most other traits are, however, the same as those of the other Negroids. Their scattered distribution is difficult to account for. It is possible that they are an ancient and primitive type which once inhabited much wider stretches of territory than now in Africa, Asia, and Oceania. On account of their inoffensiveness and backwardness, the Negritos, according to this theory, were gradually crowded to the wall by the larger, more energetic populations with which they came in contact, until only a few scattered fragments of them now remain.

The Bushmen and in some degree the Hottentots of South Africa may also be provisionally included with the Negritos, although distinctive in a number of respects. They are yellowishbrown in complexion, long headed, short and flat eared, short legged, hollow backed, and steatopygous. On the whole Negroid characteristics prevail among them. They are, for instance, frizzy-haired. Their extremely short stature may justify their tentative inclusion among the Negritos.

27. Peoples of Doubtful Position

One thing is common to the peoples who are here reckoned as of doubtful position in the classification: they all present certain Caucasian affinities without being similar enough to the recognized Caucasians to be included with them. This is true of the black, wavy-haired, prognathous, beetling-browed Australians, whose first appearance suggests that they are Negroids, as it is of the brown Polynesians, who appear to have Mongoloid connections through the Malaysians. In India, Indo-China, and the East Indies live a scattered series of uncivilized peoples more or less alike in being dark, short, slender, wavy haired, longish headed, broad nosed. The brows are knit, the eyes deep set, the mouth large, beard development medium. Resemblances are on the one hand toward the Caucasian type, on the other toward the Australian, just as the geographical position is intermediate. The name Indo-Australian is thus appropriate for this group. Typical representatives are the Vedda of Ceylon; the Irula and some of the Kolarian tribes of India; many of the Moi of several parts of Indo-China; the Senoi or Sakai of the Malay Peninsula; the Toala of Celebes. These are almost invariably hill or jungle people, who evidently represent an old stratum of population, pushed back by Caucasians or Mongoloids, or almost absorbed by them. The dark strain in India seems more probably due to these people than to any true Negroid infusion. Possibly the Indo-Australians branched off from the Caucasian stem at a very early time before the Caucasian stock was as "white" as it is now. In the lapse of ages the greater number of the Caucasians in and near Europe took on, more and more, their present characteristics, whereas this backward branch in the region of the Indian Ocean kept its primitive and undifferentiated traits. This is a tempting theory to pursue, but it extends so far into the realm of the hypothetical that its just appraisal must be left to the specialist.

Figure 8 attempts to represent graphically the degree of resemblance and difference between the principal physical types as they have been summarized in the table and preceding discussion; the genealogical tree in figure 9 is an endeavor to suggest how these types may have diverged from one another in their development.

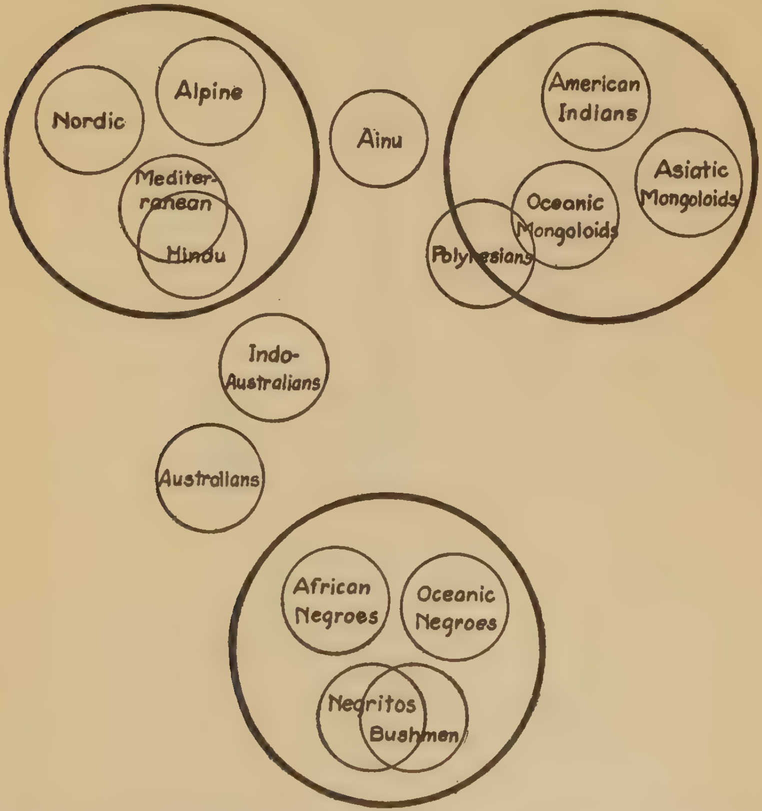

FIG. 8. Relationship of the human races. Distances between the centers of circles are indicative of the degree of similarity.

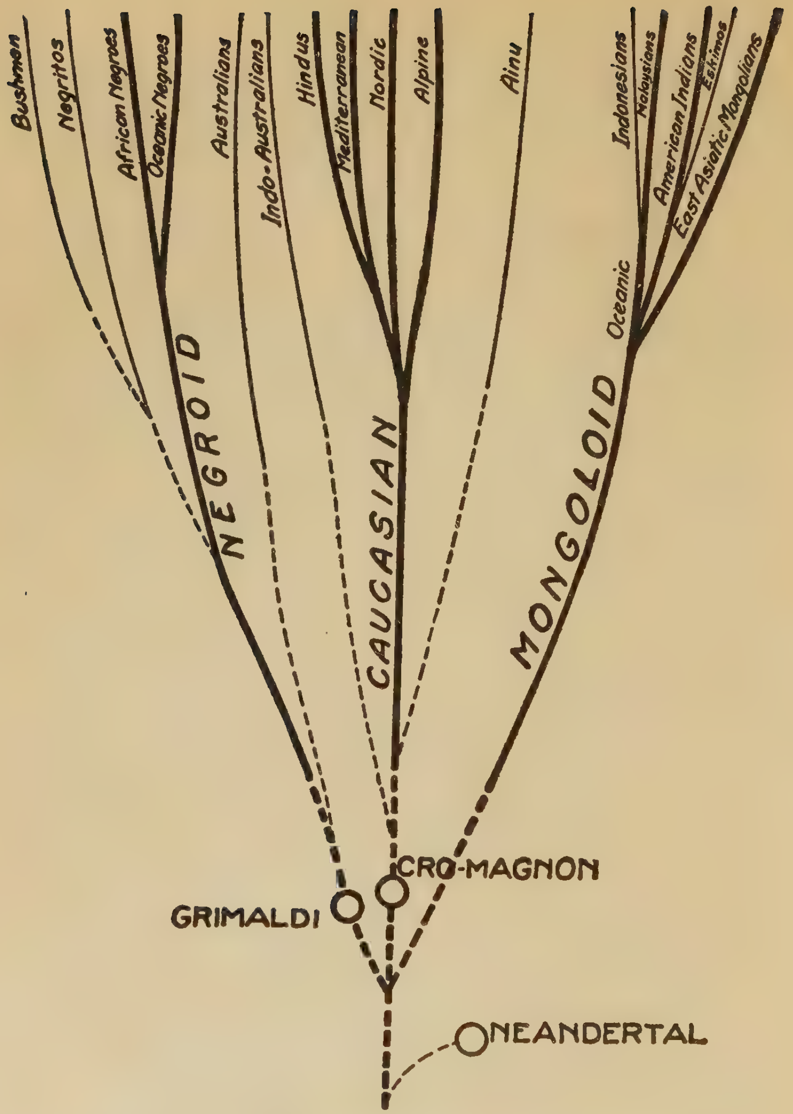

Fig. 9. Tentative family tree of the human races.

28. Continents and Oceans

One fact about the classification stands out clearly, namely, that the three grand races are not limited to particular continents. It is true that the center of gravity of the Caucasians is in or near Europe, that the biggest block of Negroids is situated in Africa, and the largest mass of Mongoloids in Asia. It is even possible that these three types evolved on these three continents. But each of them is *inter-continental* in its present distribution. Western Asia and northern Africa as well as Europe are Caucasian. There are Negroids in Oceania as well as in Africa, and the Mongoloids are found over Oceania, Asia, and both Americas.

In fact the distribution of the three primary races can better be described as oceanically marginal than as continental. The Caucasian parts of Europe, Asia, and Africa surround the Mediterranean Sea. The African and the Oceanic branches of the Negroid race are situated on the left and right sides of the Indian Ocean. The Mongoloid habitat in Oceania, in eastern Asia, and in North and South America almost encloses the Pacific Ocean. (Figs. 10 and 11.)

29. The History of Race Classifications

Most of the early classifications of mankind tried to identify races and continents too closely. The first attempt was that of Linnæus in the middle of the eighteenth century. He distinguished and described four varieties of mankind, which he called *Europœus albus, Asiaticus luridus, Americanus rufus,* and *Afer niger;* that is, European White, Asiatic Yellow, American Red, African Black.

The next classification, that of Blumenbach in 1775, is essentially the same except for adding a fifth or Oceanic variety. Blumenbach's five human races, the Caucasian, Mongolian, Ethiopian, American, and Malayan, still survive in many of the geographies of our elementary schools, usually under the designations of White, Yellow, Black, Red, and Brown; but they no longer receive scientific recognition.

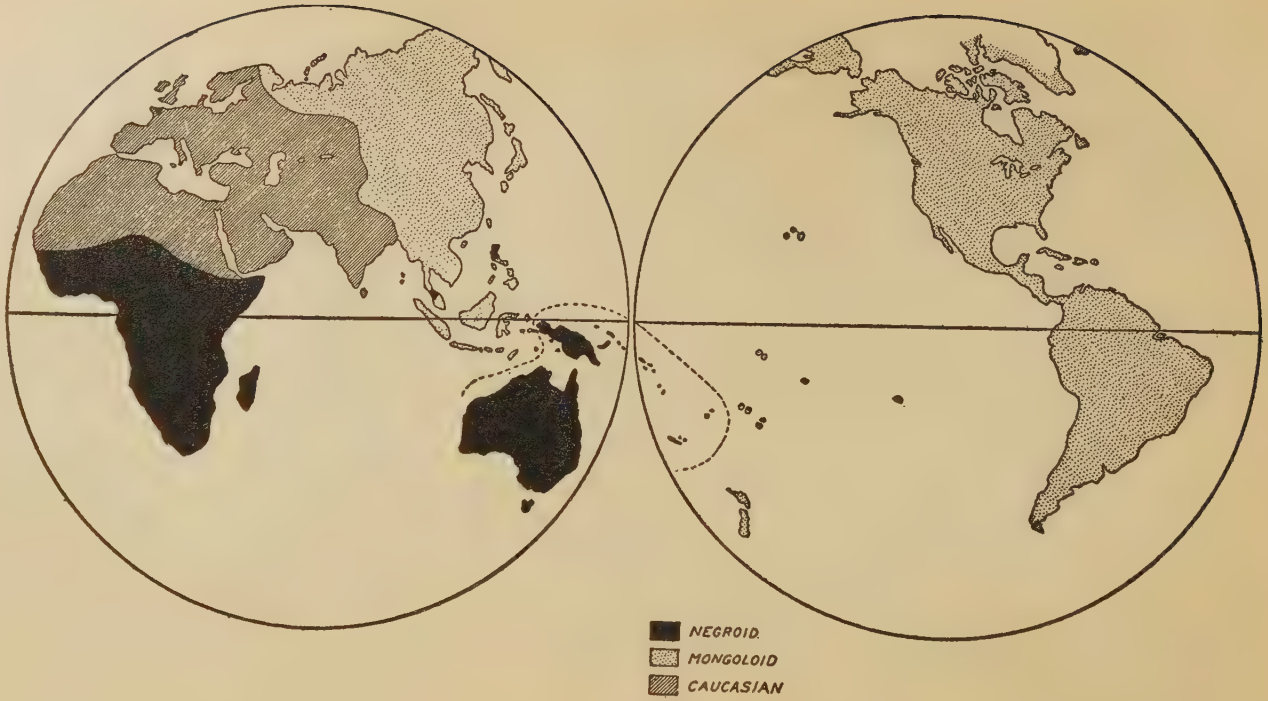

FIG. 10. Outline distribution of the primary racial stocks of mankind according to the three-fold classification, Australians, Ainu, Vedda, Polynesians, etc., being included in the stock with which they appear to affiliate most closely. A larger map with more shadings would be required to do even approximate justice to the intricacies of a complete race classification.

As time went on, the continental principle of race classification came to be recognized as inadequate, and there was a tendency among anthropologists to accept the distinctness of certain specialized groups like the Australians, Bushmen, Eskimo, and Ainu, which were often elevated into races substantially equal in rank with the great races like the Mongoloid. Thus Peschel

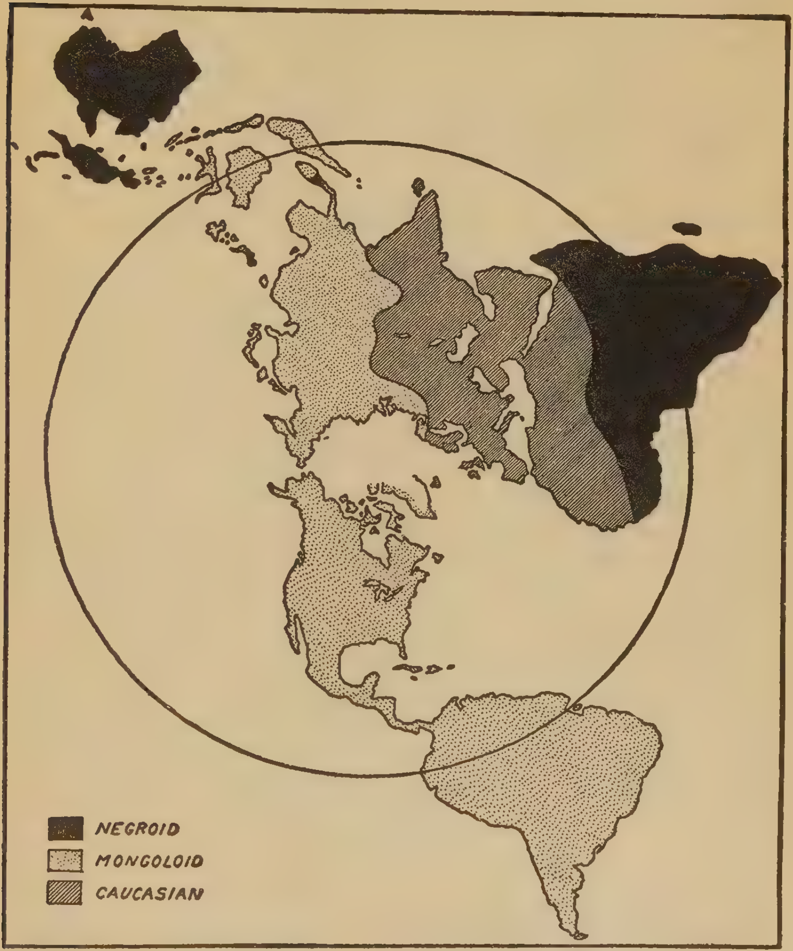

Fig. 11. Circumpolar map of primary race distribution (legend as in Figure 10).

distinguished: (1) Mediterranean or Caucasian; (2) Mongoloid (including the East Indians and Americans); (3) Negro; (4) Australian; but then separated off (5) Dravida of southern India; (6) Papuans, and (7) Hottentot-Bushmen, as if these smaller groups were coördinate with the grand ones. Nott and Gliddon also recognized seven races, although somewhat different ones: European, Asiatic, Negro, American, Malay, Australian, and Arctic. This is the fivefold scheme of Blumenbach with Australian and Arctic added.

30. EMERGENCE OF THE THREEFOLD CLASSIFICATION

On the other hand the feeling gained ground, especially as the result of the labors of French anthropologists, that mankind could be satisfactorily accounted for by a division into Caucasian, Negroid, and Mongoloid. Those who adopted this principle tried to fit divergent types like the Australians and Polynesians into one or the other of these three great groups. Some little doctoring had to be done in this process, and some salient facts estimated rather lightly. It is for this reason that it has seemed best here not to make our tripartite classification too exhaustive. This threefold classification clearly absorbs the great mass of mankind without straining, but it is soundest to recognize that this same basic classification requires a certain margin of extensions along the lines indicated in our table.

The classification made by the French anthropologist Deniker is one of the most elaborate yet devised. It recognizes 6 grand divisions, 17 minor divisions, and 29 separate races. The primary criterion of classification is hair texture.

Deniker's Classification

A. Hair woolly, with broad nose.
    I. 1. Bushman.
    II. Negroid.
        2. Negrito.
        3. Negro.
        4. Melanesian (including Papuan of New Guinea).

B. Hair curly to wavy.
    III. 5. Ethiopian (Sudan, etc.).

- IV. 6. Australian.
- V. 7. Dravidian (southern India).
- VI. 8. Assyroid (Kurds, Armenians, Jews).

C. Hair Wavy.
- VII. 9. Indo-Afghan.
- VIII. North African.
  - 10. Arab or Semite.
  - 11. Berber (N. Africa).
- IX. Melanochroid.
  - 12. Littoral (W. Mediterranean).
  - 13. Ibero-insular (Spain, S. Italy).
  - 14. Western European.
  - 15. Adriatic (N. Italy, Balkans).

D. Hair wavy to straight, with light eyes.
- X. Xanthochroid.
  - 16. North European.
  - 17. East European.

E. Hair wavy to straight, with dark eyes.
- XI. 18. Ainu.
- XII. Oceanian.
  - 19. Polynesian.
  - 20. Indonesian (East Indies).

F. Hair straight.
- XIII. American.
  - 21. South American.
  - 22. North American.
  - 23. Central American.
  - 24. Patagonian.
- XIV. 25. Eskimo.
- XV. 26. Lapp.
- XVI. Eurasian.
  - 27. Ugrian (E. Russia).
  - 28. Turco-Tartar (S.W. Siberia).
- XVII. 29. Mongol (E. Asia).

In spite of its apparent complexity, this classification coincides quite closely with the classification which is followed in this book. Inspection reveals that Deniker's grand division A is Negroid, C and D Caucasian, F Mongoloid. Of his two remaining grand divisions, B is intermediate between A and C, that is, between Negroid and Caucasian, and consists of peoples which are either, like the East Africans, the probable result of a historical mixture of Negroids and Caucasians, or which, like the Australians, share the traits of both, and are therefore admitted to have a doubtful status. The other grand division, E, is transitional between Caucasian D and Mongoloid F, and the peoples of which it consists are those whom we too have recognized as difficult to assign positively to either stock. In short, Deniker's classification is much the more refined, ours the simpler; but essentially they corroborate one another.

31. Other Classifications

Another classification that puts hair texture into the forefront is that of F. Müller. This runs as follows:

A. Ulotrichi or Woolly-haired.
  1. Lophocomi or Tuft-haired: Papua, Hottentot-Bushmen.
  2. Eriocomi or Fleecy-haired: African Negroes.

B. Lissotrichi or Straight-haired.
  3. Euthycomi or Stiff-haired: Australian, Malay, Mongolian, Arctic, American.
  4. Euplocomi or Wavy-haired: Dravidian (S. India), Nubian, (Sudan), "Mediterranean" (Europe, N. Africa, etc.).

The distinction here made between the Tuft and Fleecy-haired groups is unsound. It rests on a false observation: that a few races, like the Bushmen, had their head-hair growing out of the scalp only in spots or tufts. With the elimination of this group, its members would fall into the Fleecy or Woolly-haired one, which would thus comprise all admitted Negroids; whereas the two remaining groups, the Stiff and Wavy-haired, obviously correspond to the Mongoloid and Caucasian. The only remaining peculiarity of the classification—and in this point also it is unquestionably wrong—is the inclusion of the Australians in the Stiff or Straight-haired group. But even this error reflects an element of truth: it emphasizes the fact that in spite of their black skins, broad noses, and protruding jaws, the Australians are not straight-out Negroids.

The underlying feature of this classification, after allowing for its errors, is that mankind consists of two rather than three main branches: the Ulotrichi or Negroids, as opposed to the Lissotrichi or combined Mongoloids and Caucasians. This basic idea has been advocated by others. Boas, for instance, reckons Mongoloids and Caucasians as at bottom only subtypes of a single stock with which the Negroids and Australians are to be contrasted.

Somewhat different in plan is Huxley's scheme, which recognizes four main races, or five including a transitional one. These are (1) Australioids, including Dravidians and Egyptians; (2) Negroids, with the Bushmen and the Oceanic Papuans, Melanesians, Tasmanians, and Negritos as two subvarieties; (3) Mongoloids, as customarily accepted; (4) Xanthochroi, about equivalent to Nordics and Alpines; (5) Melanochroi, nearly the same as the Mediterraneans, but supposed by Huxley to be hybrid or intermediate between the Xanthochroi and Australioids. This classification in effect emphasizes the connection between Australoids and Caucasians, with the Negroids as a distinctive group on one side and the Mongoloids on the other.

Haeckel's classification is basically similar, in that besides the usual three primary stocks—which he elevates into species—he recognizes a separate group comprising the Australians, Dravidians, and Vedda-like Indo-Australians.

32. Principles and Conclusions Common to All Classifications

It will be seen that in spite of the differences and uncertainties as yet prevalent in any scheme for classifying the human species, certain principles stand out both as regards method and results; and in regard to these principles there is substantial agreement.

First, any valid classification must rest on a combination of as many traits or features as possible.

Second, several features of the human body are of definite significance for the discrimination of races. Hair and hairiness are unquestionably of great importance; stature, except in extreme cases, much less so. Color differences in the skin, hair, or eyes are important but difficult to handle. Shape of nose and prognathism are useful for rough classification. The cephalic index possesses an exceptional utility in making the finer discriminations.

Third, it is clearly impossible to find a simple and consistent scheme within which all the varieties of man can be placed. We must not attempt more than nature allows.

On the other hand the vast bulk of mankind does fall naturally into three great divisions, each of which again subdivides into three or four principal branches, in regard to whose distinctness there is no serious difference of opinion. The scattering remainder of races are allied sometimes to one primary stock, sometimes to another, but always with some special peculiarities.

From such a classification as this, especially after the accumulation of large series of accurate measurements which will permit its being worked out to greater exactness, we may hope ultimately to reconstruct the full and true history of the races of men, or, in any event, some reasonable hypothesis as to their development. As yet, however, we are not in a position to account for the origin of the races except speculatively.

33. Race, Nationality, and Language

The term race has here been used in its biological sense, for a group united in blood or heredity. A race is a subdivision of a species and corresponds to a breed in domestic animals. Popularly, the word is used in a different sense, namely that of a population having any traits in common, be they hereditary or non-hereditary, biological or social (Chapter I). It is customary, but scientifically inaccurate, to speak of the French race, the Anglo-Saxon race, the Gypsy race, the Jewish race. The French are a nation and nationality, with a substantially common speech; biologically, they are three races considerably mixed, but still imperfectly blended (§ 24). Anglo-Saxon refers primarily to speech, incidentally to a set of customs, traditions, and points of view that are more or less associated with the language. The Gypsies are a self-constituted caste, with folkways, occupations, and a speech of their own. The Jews, who were once a nationality, at present, of course, form a religious body, which somewhat variably, in part from inner cohesion and in part from outer pressure, tends also to constitute a caste. They evince little hereditary racial type, measurements indicating that in each country they approximate the physical type of the gentile population.

It may seem of little moment whether the word race is restricted to its strict biological sense or used more loosely. In fact, however, untold loose reasoning has resulted from the loose terminology. When one has spoken a dozen times of "the French race," one tends inevitably to think of the inhabitants of France as a biological unit, which they are not. The basis of the error is confusion of organic traits and processes with superorganic or cultural ones; of heredity with tradition or imitation. That civilizations, languages, and nationalities go on for generations is obviously a different thing from their being caused by generation. Slovenly thought, tending to deal with results rather than causes or processes, does not trouble to make this discrimination, and every-day speech, dating from a pre-scientific period, is ambiguous about it. We say not only "generation," when there is no intent to imply the reproductive process, but "good breeding" (literally, good brooding or hatching or birth), when we mean good home training or education; just as we "inherit" a fortune or a name—social things—as well as ineradicable traits like brown eye-color. Biology has secured for its processes the exclusive use of the term "heredity"; and biologists employ the term "race" only with reference to a hereditary subdivision of a species. It is equally important that the word be used with the same exact denotation in anthropology, else all discussion of race degenerates irretrievably into illogical sliding in and out between organic and social factors. The inherently great difficulties which beset the understanding and solution of what are generally called race problems, as discussed in the next chapter, are considerably increased by a confusion between what is and what is not racial and organic and hereditary.

CHAPTER IV

PROBLEMS OF RACE

34. Questions of endowment and their validity.—35. Plan of inquiry.—36. Anatomical evidence on evolutionary rank.—37. Comparative physiological data.—38. Disease.—39. Causes of cancer incidence.—40. Mental achievement and social environment.—41. Psychological tests on the sense faculties.—42. Intelligence tests.—43. Status of hybrids.—44. Evidence from the cultural record of races.—45. Emotional bias.—46. Summary.

34. QUESTIONS OF ENDOWMENT AND THEIR VALIDITY

Are the human races alike or dissimilar in mentality and character? Are some lower than others, or are they all on a plane as regards potentiality? The answers to these questions are of theoretical import, and naturally also bear on the solution of the practical race problems with which many nations are confronted.

As long as an inquiry remains sufficiently abstract or remote, the desirability of such inquiry is likely to go unquestioned. As soon, however, as investigation touches conduct—for instance, our actual relations with other races—a sentiment has a way of rising, to the effect that perhaps after all the problem does not so much call for knowledge as for action. Thus, in regard to the negro problem in the United States, it is likely to be said that the immediate issue is what may be the best attitude toward "Jim Crow" cars and other forms of segregation. Are these desirable or undesirable, fair or unfair? Here are specific problems which an actual condition presses to have answered. Under the circumstances, it will be said, is not an inquiry into the innate capacity of the negro rather remote, especially when every one can see by a thousand examples that the negro is obviously inferior to the Caucasian? He is poorer, more shiftless, less successful. He has made no inventions, produced no geniuses. He clearly feels himself inferior and comports himself accordingly. Why then raise the issue of capacity at all, unless from a desire to befog it, to subvert the conclusions of common sense and every-day experience by special pleading which substitutes adroitness for sincerity? When a prisoner has been found guilty it is the judge's business to determine the length of sentence, to decide how far justice should be tempered with mercy. Were he to reopen the case from the beginning, he would be showing partiality. Is not the situation of the scientist proposing to inquire into the accepted verdict that the negro is inferior to the Caucasian, analogous to that of a judge who insists on setting aside the verdict of twelve unprejudiced jurymen in order to retry the defendant himself? In some such form as this, objections may rise in the minds of some.

The answer to such criticism is first of all that racial inferiority and superiority are by no means self-evident truths. Secondly, the belief in race inequalities is founded in emotion and action and then justified by reasoning. That is, the belief is rationalized, not primarily inferred by pure reason. It may be true, but it is not proved true.

As to what is self-evident, there is nothing so misleading as direct observation. We see the sun move and the earth stand still. It is "self-evident" that the sun revolves around the earth. Yet after thousands of years the civilized portion of mankind finally came to believe that it was the earth that spun. Science had no perverse interest, no insidious motive, in advocating the Copernican instead of the Ptolemaic system; in fact, was driven to its new belief gradually and reluctantly. It was pre-scientific humanity, with its direct, homespun, every-day observation, which had really prejudged the matter, and which, because it had always assumed that the earth was flat and stationary, and because every idiot could see that it was so, long combated the idea that it could be otherwise.

As to opinions founded in emotion and subsequently rationalized, instead of being evolved by pure reason from evidence, it may suffice to quote from a famous book on herd instinct, as to the relation of mass opinion and science:

"When, therefore, we find ourselves entertaining an opinion about the basis of which there is a quality of feeling which tells us that to inquire into it would be absurd, obviously unnecessary, unprofitable, undesirable, bad form, or wicked, we may know that that opinion is a non-rational one, and probably, therefore, founded upon inadequate evidence.

''Opinions, on the other hand, which are acquired as the result of experience alone do not possess this quality of primary certitude. They are true in the sense of being verifiable, but they are unaccompanied by that profound feeling of truth which belief possesses, and, therefore, we have no sense of reluctance in admitting inquiry into them. That heavy bodies tend to fall to the earth and that fire burns fingers are truths verifiable and verified every day, but we do not hold them with impassioned certitude, and we do not resent or resist inquiry into their basis; whereas in such a question as that of the survival of death by human personality we hold the favorable or the adverse view with a quality of feeling entirely different, and of such a kind that inquiry into the matter is looked upon as disreputable by orthodox science and as wicked by orthodox religion. In relation to this subject, it may be remarked, we often see it very interestingly shown that the holders of two diametrically opposed opinions, one of which is certainly right, may both show by their attitude that the belief is held instinctively and non-rationally, as, for example, when an atheist and a Christian unite in repudiating inquiry into the existence of the soul.''

Take the attitude of the average Californian or Australian about the Mongolian; of the Texan about the Mexican; of the Southerner about the Negro; of the Westerner about the local tribes of Indians; of the Englishman about the Hindu—is not their feeling exactly described by the statement that inquiry into the possibility of racial equality would be ''unnecessary,'' ''absurd,'' or evilly motivated; and that their belief in race superiority rests on an ''a priori synthesis of the most perfect sort,'' and possesses ''the quality of primary certitude''?

In short, the apparently theoretical beliefs held as to race capacity by people who are actually confronted by a race conflict or problem are by no means the outcome of impartial examination and verification, but are the result of the decisions taken and emotions experienced in the course of acts performed toward the other race. The beliefs rest ultimately on impulse and feeling; their reasoned support is a subsequent bolstering up. Of course, the fact that a belief springs from emotion does not render that belief untrue, but does leave it scientifically unproved, and calling for investigation.

These conclusions may vindicate inquiry into the relative capacity of races from the charge of being finespun, insidious, impractical, or immoral.

35. Plan of Inquiry

In approach to the problem, a consideration stands out. If the human races are identical in capacity, or if, though not absolutely alike, they average substantially the same in the sum total of their capacities, then such differences as they have shown in their history or show in their present condition must evidently be the result mainly of circumstances external to heredity. In that case, knowledge of the historical or environmental circumstances, and analysis of the latter, become all-important to understanding. On the other hand, if hereditary racial inequalities exist, one can expect that the historical or cultural influences, however great they may be, will nevertheless tend to have their origin in the hereditary factors and to reinforce them. In that case, differences between two groups would be due partly to underlying heredity and partly to overlying cultural forces tending on the whole in the same direction. Yet even in that case, before one could begin to estimate the strength of the true racial factors, the historical ones would have to be subtracted. Thus, in either event, the first crux of the problem lies in the recognition and stripping off of cultural, social, or environmental factors, so far as possible, from the complex mass of phenomena which living human groups present. In proportion as these social or acquired traits can be determined and discounted, the innate and truly racial ones will be isolated, and can then be examined, weighed, and compared. Such, at any rate, is a reasonable plan of procedure. We are looking for the inherent, ineradicable elements in a social animal that has everywhere built up around himself an environment—namely, his culture—in which he mentally lives and breathes. It is precisely because in the present inquiry we wish to get below the effects of culture that we must be ready to

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concern ourselves considerably with these effects, actual or possible.

36. ANATOMICAL EVIDENCE ON EVOLUTIONARY RANK

But first of all it may be well to consider the relatively simple evidence which has to do with the physical form and structure of race types. If one human race should prove definitely nearer to the apes in its anatomy than the other races, there would be reason to believe that it had lagged in evolution. Also there would be some presumption that its arrears were mental as well as physical.

But the facts do not run consistently. One thinks of the Negro as simian. His jaws are prognathous; his forehead recedes; his nose is both broad and low. Further, it is among Caucasians that the antithetical traits occur. In straightness of jaws and forehead, prominence and narrowness of nose, Caucasians in general exceed the Mongoloids. Thus the order as regards these particular traits is: ape, Negroid, Mongoloid, Caucasian. With ourselves at one end and the monkey at the other, the scale somehow seems right. It appeals, and seems significant. Facts of this sort are therefore readily observed, come to be remembered, and rise spontaneously to mind in an argument on race differences.

However, there are numerous items that conflict with this sequence. For instance, one of the most conspicuous differences of man from the apes is his relative hairlessness. Of the three main stocks, however, it is the Caucasian that is the most hairy. Both Mongoloids and Negroids are more smooth-skinned on face and on body.

In hair texture, the wavy-haired Caucasian is nearest the apes, the straight-haired Mongoloid comes next, and the woolly Negroid is the most characteristically human, or at least unsimian.

In the length of head hair, in which man differs notably from the monkeys, the relatively short-haired Negro once more approximates most closely to the ape, but the long-haired Mongoloid surpasses the intermediate Caucasian in degree of departure.

Lip color reverses this order. The apes' lips are thin and grayish; Mongoloid lips come next; then those of Caucasians; the full, vivid, red lips of the Negro are the most unapelike of all.

It is unnecessary to multiply examples. If one human racial stock falls below others in certain traits, it rises above them in other features, insofar as "below" and "above" may be measurable in terms of degree of resemblance to the apes. The only way in which a decision could be arrived at along this line of consideration would be to count all features to see whether the Negro or the Caucasian or the Mongoloid was the most unapelike in the plurality of cases. It is possible that in such a reckoning the Caucasian would emerge with a lead. But it is even more clear that whichever way the majority fell, it would be a well divided count. If the Negro were more apelike than the Caucasian in all of his features, or in eight out of ten, the fact would be heavily significant. With his simian resemblances aggregating to those of the Caucasian in a ratio of say four to three, the margin would be so close as to lose nearly all its meaning. It is apparently some such ratio as this, or an even more balanced one, that would emerge, so far as we can judge, if it were feasible to take a census of all features.

It should be added that such a method of comparison as this suffers from two drawbacks. First, the most closely related forms now and then diverge sharply in certain particulars; and second, a form which on the whole is highly specialized may yet have remained more primitive, or have reverted to greater primitiveness in a few of its traits, than relatively unevolved races or species.

Thus, the anthropoid apes are brachycephalic, but all known types of Palæolithic man are dolichocephalic. Matched against the apes, the long-headed Negro would therefore seem to be the most humanly specialized stock. Compared however with the fossil human forms, the Negro is the most primitive in this feature, and the Mongoloid and Alpine Caucasian could be said to have evolved the farthest because their heads are the roundest. Yet their degree of brachycephaly is approximately that of the anthropoid apes. To which criterion shall be given precedence? It is impossible to say. Quite likely the round-headedness of the apes represents a special trait which they acquired since their divergence from the common hominid ancestral stem. If so, their round-headedness and that of the Mongoloids is simply a case of convergent evolution, of a character repeating independently, and therefore no evidence of Mongoloid primitiveness. Yet, if so, the long-headedness common to the early human races and the modern Negroids would probably also mean nothing.

It is even clearer that other traits have been acquired independently, have been secondarily evolved over again. Thus the supraorbital ridges. When one observes the consistency with which these are heavy in practically all Neandertal specimens; how they are still more conspicuous in Pithecanthropus and Rhodesian man; how the male gorilla shows them enormously developed; and that among living races they are perhaps strongest in the lowly Australian, it is tempting to look upon this bony development as a definite sign of primitiveness. Yet there is an array of contradicting facts. The youthful gorilla and adult orang are without supraorbital development. The male gorilla has his powerful brows for the same reason that he has the crest along the top of his skull: they are needed as attachments for his powerful musculature. They are evidently a secondary sex character developed within the species. So among fossil men there seem to have been two strains: one represented by Pithecanthropus and Neandertal man and the Rhodesian race, which tended toward supraorbital massiveness; and another, of which Piltdown man is representative, which was smooth of forehead. Among living races the Asiatic Mongoloids lack marked supraorbital development; the closely related American Indians possess it rather strongly; Caucasians and Negroes show little of the feature; Australians most of all. Evidently it would be unsafe to build much conclusion on either the presence or absence of supraorbital ridges.

Perhaps these instances will suffice to show that even the mere physical rating of human races is far from a simple or easy task. It is doubtful whether as yet it is valid to speak of one race as physically higher or more advanced, or more human and less brutish, than another. This is not an outright denial of the possibility of such differential ratings: it is a denial only of the belief that such differentials have been established as demonstrable.

37. Comparative Physiological Data

There is another angle of approach. This consists in abandoning the direct attempt to rate the races in anatomical terms, and inquiring instead whether they show any physiological differences. If such differences can be found, they may then perhaps be interpretable as differences in activity, responsiveness, endurance, or similar constitutional qualities. If the bodies of two races behave differently, we should have considerable reason to believe that their minds also behaved differently.

Unfortunately, we possess fewer data on comparative physiology than on comparative anatomy. The evidence is more fluctuating and intricate, and requires more patience to assemble. Unfortunately, too, for the purposes of our inquiry, the races come out almost exactly alike in the simpler physiological reactions. The normal body temperature for Caucasian adults is 37° (98.5 F.), the pulse about 70, the respiration rate around 17 or 18 per minute. If the Negro's temperature averaged even a degree higher, one might expect him to behave, normally, a little more feverishly, to respond to stimulus with more vehemence, to move more quickly or more restlessly. Or, if the pulse rate of Mongolians were definitely lower, they might be expected to react more sluggishly, more sedately, like aging Caucasians. But such observations as are available, though they are far from as numerous as is desirable, reveal no such differences: temperature, pulse, respiration, record the same as among Caucasians, or differ so slightly, or so conflictingly, as to leave no room for positive conclusions. Certainly if there existed any important racial peculiarities, they would have been noted by the physicians who at one time or another have examined millions of Negroes, Chinese, Japanese, and thousands of Indians and Polynesians.

Apparently there is only one record that even hints at anything significant. Hrdlička, among some 700 Indians of the Southwestern United States and Northwestern Mexico, found the pulse to average about 60 per minute, or ten beats less than among whites. This would seem to accord with the general impression of Indian mentality as stolid, reserved, slow, and steady. But the number of observations is after all rather small; the part of the race represented by them is limited; and the habitat of the group of tribes is mostly a high plateau, and altitude notoriously affects heart action. Considerable corroboration will therefore be needed before any serious conclusions can be built upon this suggestive set of data.

There are other physiological functions that are likely to mean more than the rather gross ones just considered: for instance, the activity of the endocrines or glands of internal secretion. An excess or deficiency of activity of the thyroid, pituitary, adrenals, and sex glands affects not only health, but the type of personality and its emotional and intellectual reactions. For example, cretinism with its accompaniment of near-idiocy is the result of thyroidal under-development or under-functioning, and is often cured by supplying the lack of thyroidal substance and secretion. But this subject is as difficult as it is interesting; to date, absolutely nothing is known about endocrine race differences. It would be a relatively simple matter to secure first-hand information on the anatomy of the endocrine glands in Negroes as compared with whites; to ascertain whether these differed normally in size, weight, shape, or structure, and how. But this knowledge has scarcely been attempted systematically, and still less is any knowledge available in the more delicate and complex field of the workings of the organs. To be sure, theories have been advanced that race differentiation itself may be mainly the result of endocrine differentiations. There is something fascinating about such conjectures, but it is well to remember that they are unmitigated guesses.

38. DISEASE

Pathology might seem to promise more than normal physiology. So far as mortality goes, there are enormous differences between races. And the mortality is often largely the result of particular diseases. Measles, for instance, has often been a deadly epidemic to uncivilized peoples, and smallpox has in some regions at times taken toll of a quarter of the population in a year or two. Yet it is short-sighted to infer from such cases any racial predisposition or lack of resistance. The peoples in question have been free for generations, perhaps for their entire history, from these diseases, and have therefore not maintained or acquired immunity. Their difference from us is thus essentially in experience, not hereditary or racial. This is confirmed by the fact that after a generation or two the same epidemics that at first were so deadly to Polynesians or American Indians sink to almost the same level of mild virulence as they show among ourselves.

Then, too, immediate environment plays a part. The savage often has no idea of contagion, and still less of guarding against it; he thinks in terms of magic instead of physiology—and succumbs. How far heavy mortality is the result of lack of resistance or of fundamentally vicious treatment, is often hard to say. If we tried to cure smallpox by subjecting patients to a steam-bath and then having them plunge into a wintry river, we should perhaps look upon the disease as a very nearly fatal one to the Caucasian race.

39. Causes of Cancer Incidence

It may be worth while to consider briefly the facts as to mortality from cancer. This dread disease appears to be not contagious, so that the factor of acquired immunity is eliminated. It is regarded as incurable, except by operation, so that differences in treatment become relatively unimportant. If therefore significant differences in racial liability to cancer exist, they should emerge with unusual clearness and certainty.

At first sight they seem to. It has been alleged that the white race is the most susceptible to this affliction. The supporting figures are as follows: cancer deaths per year per 100,000 population.

1906–10	Denmark	137
	England	94
	United States	73
1909–11	Johannesburg, whites	52
	Negroes	14
1906–10	Natal, Europeans	56
	East Indians	11

1906–10	Hongkong, Europeans	53
	Chinese	5
1912	Dutch East Indies, Europeans	81
1906–10	Singapore, natives	13
	Straits Settlements, natives	10
	Ceylon, natives	5
	Calcutta, natives	11
1908–13	Manila, whites	51
	Filipinos	27
	Chinese	19
1910–12	United States, whites	77
	Negroes	56
1914	United States, Indians	4

It would seem from these figures that Caucasians die more frequently of cancer than members of the darker races. In fact, this has been asserted. Let us however continue with figures.

1908–12	Large cities, latitudes	60°–50° North	106
		50°–40° "	92
		40°–30 "	78
		30° North–30° South	38–42
		30°–40° South	90

This table would make cancer mortality largely a function of geographical latitude, instead of race.

Another factor enters: occupation. The following data give the death rate per 100,000 population among males of 45-54 in England and Wales.

	1890-92	1900-02
Lawyers	199	159
Physicians	102	121
Clergymen	81	91
Chimneysweeps	532	287
Brewers	190	239
Metal workers	120	137
Gardeners	88	93
All occupations	118	145

That the relative incidence is more than a temporary accident is shown by the approximate recurrence of the frequencies after ten years.

In proportion as latitude and occupation influence the occurrence of cancer, race is diminished as a cause. It is reduced still further by other considerations. The rate for Austria in 1906-10 was 78, for Hungary 44. Here the race is the same: the difference must be social. Austria averaged higher in wealth, education, medical development. This fact would tend to have a double effect. First, among the more backward population, a certain proportion would die of internal cancers difficult to diagnose, without the cause being recognized, owing to insufficient medical treatment. Second, the general death rate would be higher. More children and young people would die of infectious or preventable disease, leaving fewer survivors to die of cancer in middle and old age. Wherever, on the other hand, a public is medically educated, and typhoid, smallpox, diphtheria, tuberculosis claim fewer victims, the proportion of those dying of cancer, nephritis, heart diseases, increases. Such an increase is noted everywhere, and goes hand in hand with a longer average life. The alarm sometimes felt at the modern ''increase'' of cancer is therefore unfounded, because it is perhaps mainly apparent. If a larger percentage of the population each year died of old age, it would be a sign that sanitation and medicine were increasingly effective: evidence that more people lived to become old, not that age debility was spreading.

Consequently, a high degree of modern civilization must tend to raise the cancer rate; and any group of people will seem relatively immune from cancer in proportion as they remain removed from attaining to this civilization. In Hungary, from 1901-04, the cancer deaths were 239 among the owners of large farms, 41 among the owners of small farms; 108 among employing blacksmiths, 25 among their employees; 114 among employing tailors, 32 among employed tailors. Obviously these pairs of groups differ chiefly in their economic and cultural status.

Here too lies the explanation of why the South African negro shows a rate of only 14, the United States negro of 56; also why the Chinese rate is as low as 5 in Hongkong, rises to 19 in Manila, and 26 in Hawaii, while the closely allied Japanese average 62 for the whole of Japan—as compared with 50 for Spain, which is pure Caucasian, but one of the most backward countries in Europe. In Tokyo and Kyoto the rate soars to 73 and 90 respectively, just as in the United States it is about 10 higher for the urban than for the rural population.

Within the United States, also, the rate rises and falls almost parallel for whites and Negroes according to locality; as,

1906-10	*White*	*Negro*
Memphis	59	34
Charleston	73	37
Nashville	74	55
New Orleans	86	73

If allowance is made for the facts that the negro population of the United States is poorer and less educated than the white; that it lives mainly in lower latitudes; and that it tends to be rural rather than urban, the comparative cancer death rates for the country of negro 56 and white 77 would appear to be accounted for, without bringing race into consideration.

In short, what at first glance, or to a partisan pleader, would seem to be a notable race difference in cancer liability, turns out so overwhelmingly due to environmental and social causes as to leave it doubtful whether racial heredity enters as a factor at all. This is not an assertion that race has nothing whatever to do with the disease; it is an assertion that in the present state of knowledge an inherent or permanent connection between race and cancer incidence has not been demonstrated. If there is such a connection, it is evidently a slight one, heavily overlaid by non-racial influences; and it may be wholly lacking.

The case would be still less certain for most other diseases, in which environmental factors are more directly and obviously influential. Racial medical science is not impossible; in fact it should have an important future as a study; but its foundations are not yet laid.

40. Mental Achievement and Social Environment

One point will have become clear in the course of the foregoing discussion: namely, how far the difficulty of coming to positive conclusions is due to the two sets of interacting causal factors, the hereditary ones and the environmental ones that play upon heredity. The environmental factors are themselves a composite of geographical influences and of the economic, cultural, and other social influences that human beings exert upon each other.

If this intermingling of distinct kinds of causes is true of races when considered from the side of physiology and medicine, it is evident that the intermingling will be even more intricate in the mental sphere. After all, bodily functioning varies only within fairly definite limits. When external influences press too strongly upon the innate nature of the organism, the latter ceases to function and dies. The mind, on the other hand, however much its structure may be given by heredity, depends for its content wholly on experience, and this experience can be thoroughly varied. Individuals of the same organic endowment may conceivably be born either in the uppermost stratum of a highly refined civilization, or among the most backward and remote savages. Whether this actually happens, and to what degree, is of course precisely the problem which we are trying to solve. But that it is theoretically and logically possible cannot be denied; and here a vicious circle of reasoning begins. One argument says: there have been no recognized geniuses among peoples like the Hottentots, and the sum total of their group achievement is ridiculously small; therefore it is clear that the Hottentot mind must be inferior. The opposite argument runs: Hottentot cultural environment is so poor and limited that the finest mind in the world reared under its influence would grow up relatively sterile and atrophied; therefore it is probable that the mind of the Hottentot is intrinsically identical with our own, or at least of equivalent capacity, and that Hottentot geniuses have actually been born but have been unable to flourish as geniuses.

Evidently the same facts are before those who advocate these opposite views, but these facts are viewed from diametrically opposite sides. If one starts to travel around the logical circle in one direction, one can keep revolving indefinitely and find ever fresh supporting evidence. If, however, one begins to revolve around the same circle of opinion in the opposite direction, it is just as easy and just as compelling to continue to think in this fashion and to find all testimony corroborative.

In such a situation it is possible to realize that from the point of view of proof, or objective truth, one view is worth as much as the other: which is nothing. It is an emotional bias that inclines one man toward the conviction of race superiority and another to that of race equality. The proofs in either case are for the most part a mere assembling of ex parte testimony. It is easy enough to advocate impartiality. The difficulty is in being impartial; because both the hereditary and the environmental factors are in reality unknown quantities. What we have objectively before us is such and such a race or group of people, with such and such present traits and historical record. These phenomena being the product of the interaction of the two sets of causes, we could of course, if we knew the strength of one, compute the strength of the other. But as we have isolated neither, we are dealing with two indeterminate variables. Evidently the only way out of the dilemma, at any rate the only scientific way, is to find situations in which one of the factors is, for the time being, fixed. In that case the strength of the other factor will of course be proportionate to the attainments of the groups.

Actually, such instances are excessively difficult to find. There are occasional individuals with identical heredity, namely, twins produced from the division of a single ovum. In such twins, the strength of environmental influences can be gauged by the difference in their careers and achievements. Yet such twins are only individuals, and it is illegitimate to make far-reaching inferences from them to larger groups, such as the races. It is conceivable that heredity might on the whole be a more powerful cause than environment, and racial groups still average substantially alike in their heredity. Because a natively gifted and a natively stunted individual within the group vary conspicuously in achievement, even under similar environment, it does not follow that races differ in germ-plasm because they differ in achievements.

If, on the other hand, one sets out to discover cases of identical environment for distinct racial strains, the task quickly becomes even more difficult. Very little analysis usually suffices to show that the environment is identical only up to a certain point, and that beyond this point important social divergences begin. Thus, so far as geographical environment goes, the Negro and the white in the southern United States are under the same conditions. There is also uniformity of some of the gross externals of cultural environment. Both Negroes and whites speak English; are Christians; plant corn; go to the circus; and so on. But, just as obviously, there are aspects in which their social environment differs profoundly. Educational opportunities are widely different. The opportunity of attaining leadership or otherwise satisfying ambition is wide open to the white, and practically closed to the Negro. The "color-line" inevitably cuts across the social environment and makes of it two different environments.

It might be said that the southern United States furnish an extreme case of a sharply drawn color-line. This is true. But on the other hand there is no place on earth where something corresponding to a color-line is not drawn between two races occupying the same territory. It sometimes happens that distinctions are diminished and faintly or subtly enforced, as in modern Hawaii, where to outward appearances many races dwell together without discrimination. Yet examination reveals that the absence of discrimination is only legal and perhaps economic. As regards the relations and associations of human beings, the welcome which they extend or the aloofness which they show to one another, there is always a color-line. This means not only difference in opportunity, but difference in experience, habit formation, practices, and interests.

41. Psychological Tests on the Sense Faculties

This factor of experience enters even into what appear to be the simplest mental operations, the sensory ones. The scant data available from experimental tests indicate that a variety of dark skinned or uncivilized peoples, including Oceanic and African Negroids, Negritos, Ainus, and American Indians, on the whole slightly surpass civilized whites in keenness of vision and fineness of touch discrimination, whereas the whites are somewhat superior in acuity of hearing and sensitiveness to pain. Yet what do these these results of measurements mean?

Vision is tested for its distance ability. The farther off one can distinguish objects or marks, the higher one's rating. Civilized man reads—normally—at 14 inches. He works with sharp knives, with machines that are exact; he is surrounded by things made with such exact machines; he handles thin paper and filmy fabrics. His women sew and embroider with the sharpest of needles, the finest of thread. Everything about us tends toward close accuracy and away from the haziness of distant observation. The savage, on the other hand, the half-civilized person even, inspects the horizon, watches for game or its dim tracks, tries to peer to the bottom of streams for fish. He does not read, his needles are blunt, his thread is cord, his carving without precision even though decorative, the lines he makes are free-hand and far-apart. He is trained, as it were, for the usual vision tests. If the psychologist reversed his experiment and sought the degree of power to see fine differences at close range, it is possible that the savage might prove inferior because untrained by his experience. Such tests seem not to have been made. Until they are, and again show uncivilized man superior, there is no real proof that innate racial differences of serious moment exist.

The whole act of vision in fact involves more than we ordinarily think. After all, seeing is done with the mind as well as with the eye. There is the retinal image, but there is also the interpretation of this image. A sailor descries the distant shore, whereas the landsman sees only a haze on the horizon. To the city dweller a horse and a cow a mile off are indistinguishable. Not so to the rancher. There is something almost imperceptible about the profile of the feeding end of the animal, about its movement, that promptly and surely classes it. At still longer ranges, where the individual animals have wholly faded from sight, a herd of cattle may perhaps be told from one of horses, by the plainsman, through the different clouds of dust which they kick up, or the rate of motion of the cloud. An hour later when the herd is reached and proves to be as said, the astonished traveler from the metropolis is likely to credit his guide's eyes with an intrinsic power greater than his field glasses—forgetting the influence of experience and training.

In keenness of hearing, on the contrary, one should expect the civilized white to come out ahead, as in fact he does; not because he is Caucasian but because he is civilized and because the instruments of experimentation, be they tuning forks or ticking watches or balls dropped on metal plates, are implements of civilization. Make the test the howl of a distant wolf, or the snapping of a twig as the boughs bend in the wind, and the college student's hearing might prove duller than that of the Indian or Ainu. There is a story of a woodsman on a busy thoroughfare, amid the roar of traffic and multifarious noise of a great city, hearing a cricket chirp, which was actually discovered in a near-by open cellar. Extolled for his miraculous keenness of audition, the man in the fur cap dropped a small coin on the pavement: at the clink, passers-by across the street stopped and looked around.

As to the pain sense, an introspective, interpretative element necessarily enters into experiments. What constitutes pain? When the trial becomes disagreeable? When it hurts? When it is excruciating? The savage may physiologically feel with his nerve ends precisely as we do. But being reared to a life of chronic slight discomforts, he is likely to think nothing of the sensation until it hurts sharply; whereas we signal as soon as we are sure that the experience is becoming perceptibly unpleasant.

In short, until there shall have been more numerous, balanced, and searching tests made, it must be considered that nothing positive has been established as to the respective sensory faculties of the several human races. The experiments performed are tests not so much of race as of the average experience and habits of groups of different culture.

42. Intelligence Tests

If this is true as regards the sense faculties, it might be expected to hold to a greater degree of those higher mental faculties which we call intelligence; and such is the case. Intelligence tests have been gradually evolved and improved, the best known being the Binet-Simon series. These are arranged to determine the mental age of the subject. Their most important function accordingly has been the detection of defective adults or backward children. During the World War, psychological examinations were introduced on a scale unheard of before. The purpose of these examinations was to assign men to the tasks best commensurate with their true abilities; especially to prevent the unfit from being entrusted with responsibility under which they would break down and bring failure on larger undertakings. Men subject to dizziness were to be kept from flying; those unable to understand orders, out of active line service. The tests throughout were practical. They tried to decide whether a given man was fit or unfit. They did not pretend to go into the causes of his fitness or unfitness. This is an important point. Whatever illumination the army intelligence tests shed on the problem of race intelligence is therefore indirect. Different racial or national groups represented in the examinations attain different capacity ratings, but there is nothing in the results themselves to show whether they are due to racial or environmental factors. Evidence on this point, if it can be derived at all from the tests, has to be "analyzed out."

In general, examinees in the United States were rated by being assigned, on the basis of their scores, to grades which were lettered from A to E, with plus and minus subgrades. The most comprehensive presentation of results is to express the percentage of individuals in each group that made the middle grade C, better than C, and worse than C. On this basis we find:

Group and Number of Individuals	*Below C*	*C*	*Above C*
Englishmen, 411	9	71	20
White draft generally, 93,973	24	64	12
Italians, 4,007	63	36	1
Poles, 382	70	30	(.5)
Negroes generally, 18,891	79	20	1

These figures at face value seem to show deep group differences in intelligence; and these face values have been widely accepted. The reason is that they flatter national and race egotism. To be sure, the Englishmen in the American draft make a better showing than the drafted men at large; but this has been complacently explained by saying that the English represent in comparative purity the Anglo-Saxon or Nordic stock which is also the dominant strain among Americans, but which has been somewhat contaminated in their case by the immigration of Latins and Slavs, who rate much lower, as shown by the Italians and Poles tested. Lowest of all, as might be expected, is the Negro. So runs the superficial but satisfying interpretation of the figures—satisfying if one happens to be of North European ancestry.

But there is one feature that raises suspicion. The Italians and the Poles are too close to the Negroes. They stand much nearer to them in intelligence, according to these figures, than they do to the white Americans. Can this be so—at least, can it have racial significance? Are these Mediterraneans, descendants of the Romans, and these Alpines, so large a strain of whose blood flows in the veins of many white Americans, only a shade superior to the Negro? Scarcely. "Something must be wrong" with the figures: that is, they contain another factor besides race.

A little dissection of the lump results reveals this factor. The northern Negro far surpasses the southern in his showing. He gets ten times as high a proportion of individuals into the above-average grades, only half as many into the below-average. Evidently the difference is due to increased schooling, improved earning capacity, larger opportunity and incentive: social environment, in short. So strong is the influence of the environment that the northern Negro easily surpasses the Italian in America.

Negroes, 5 northern states, 4,705	46	51	3
Italians, 4,007	63	36	1
Negroes, 4 southern states, 6,846	86	14	(.3)

Evidently the psychological tests are more a gauge of educational and social opportunity than of race, since the Italian, although brunet, is of course a pure Caucasian.

This conclusion is reinforced by another consideration. The type of test first used in the army had been built up for reasonably literate people, speaking English. Among such people it discriminated successfully between the more and the less fit. But the illiterate and the foreigner knowing no English failed completely—not because their intelligence was zero, but because the test involved the use of non-congenital abilities which they had not acquired. A second set of tests, known as Beta, was evolved for those who were obviously ineligible, or proved themselves so, for the old style of test, which was designated as Alpha. The illiteracy of the subjects given the Beta test was in most cases not an absolute one. Men who could not write an intelligible letter or read the newspaper or who had had only half or less of the ordinary grammar school education, together with aliens whose comprehension of English remained imperfect, were put in the group of "illiterates" or badly educated. Separating now the literates from the illiterates among a number of racial, national, or sectional groups, we find:

Alpha Test: Literates

Englishmen, 374	5	74	21
White draft generally, 72,618	16	69	15
Alabama whites, 697	19	72	9
New York negroes, 1,021	21	72	7
Italians, 575	33	64	3
Negroes generally, 5,681	54	44	2
Alabama negroes, 262	56	44	(.4)

Beta Test: Illiterates

White draft generally, 26,012	58	41	1
Italians, 2,888	64	35	1
New York negroes, 440	72	28	0
Poles, 263	76	24	(.4)
Alabama whites, 384	80	20	0
Negroes generally, 11,633	91	9	(.2)
Alabama Negroes, 1,043	97	3	(.1)

It must be borne in mind that the two groups were not set apart as the result of tests, but that the two tests were devised to meet the problem of treating the two groups with reasonable uniformity. The point was to find the excellent man, and the unfit man, with the same degree of accuracy whether he was literate or illiterate. When found, he was assigned to the same grade, such as A, or D —, whether his examination had been Alpha or Beta.

Now let us observe some of the figures. The New York negro is nearly on a par with the Alabama white, among literates, and a bit ahead of him among illiterates. Approximately the two groups come out the same; which means that bringing up in a certain part of the country has as much to do with intelligence, even in the rough, as has Caucasian or colored parentage.

The literate negroes of the draft, irrespective of section, slightly surpass the illiterate whites.

In every case the literate members of a race or nationality make a far better showing than the illiterate.

It is now clear also that the important factor of education enters so heavily into the first figures cited that they can mean little if anything as to inherent capacity. Of the Englishmen tested, nine-tenths fell in the literate group; of the Poles, a fifth; of the Italians, a seventh. In the draft generally, nearly three-fourths of the whites were literate; of the negroes, less than a third.

In short, in spite of the fact that the Beta test was intended to equalize conditions for the illiterate and semi-illiterate, the outstanding conclusion of the army examinations seems to be that education—cultural advantage—enormously develops faculty.

Is there anything left that can positively be assigned to race causation? It may be alleged that within the same section the white recruits regularly surpass the colored. Alabama whites may rate disappointingly, but they do better than Alabama negroes; New York negroes show surprisingly well, but they are inferior to New York whites; illiterate whites from the whole country definitely surpass illiterate negroes; and still more so among literates. But is this residuum of difference surely racial? As long as the color-line remains drawn, a differential factor of cultural advantage is included; and how strong this is there is no present means of knowing. It is possible that some of the difference between sectionally and educationally equalized groups of whites and negroes is really innate and racial. But it is also possible that most or all of it is environmental. Neither possibility can be demonstrated from the unrefined data at present available.

43. Status of Hybrids

In nearly all tests of the American Negro, full bloods and mixed bloods are not discriminated. Evidently if races have distinctive endowments, the nature of these endowments is not cleared up so long as individuals who biologically are seven-eighths Caucasian are included with pure Negroes merely because in this country we have the social habitude of reckoning them all as "colored."

On the other hand, an excellent opportunity to probe deeper is being lost through the failure to classify tested colored people according to the approximate proportion of Negro blood. Suppose for instance that on a given examination whites scored an average of 100 and Negroes of 60. Then, if this difference were really due to race, if it were wholly a matter of superior or inferior blood, mulattos should average 80 and quadroons 90; unless intelligence were due to simple Mendelian factors, in which case its inheritance would tend to segregate, and of this there is no evidence. Suppose, however, that instead of the theoretically expectable 80 and 90, the mulattos and quadroons scored 65 and 68. In that event it would be clear that the major part of the Negro's inferiority of record was due to environment; that the white man's points from about 70 up to 100 were clearly the result of his superior social opportunities, whereas the range between 60 and 70 approximately represented the innate difference between Negro and Caucasian. This is a hypothetical example, but it may serve to illustrate a possible method of attacking the problem.

There are however almost no data of this kind; and when they are obtained, they will be subject to certain cautions upon interpretation. For instance, in the army examinations one attempt was made to separate a small group of colored recruits into a darker-skinned group, comprising full blooded Negroes and those appearing to be preponderantly of Negro blood; and a lighter complexioned group, estimated to contain the mulattos and individuals in whom white ancestry was in excess. The light group made the better scores. In the Alpha test for literates it attained a median score of 50, the dark Negroes only 30; in the Beta tests for illiterates, the respective figures were 36 and 29.

The caution is this. Is the mulatto subject to any more advantageous environment than the full blooded Negro? So far as voting and office-holding, riding in Pullman cars and occupying orchestra seats in theatre are concerned, there is no difference: both are colored, and therefore beyond the barrier. But the mulattos of slavery days were likely to be house servants, brought up with the master's family, absorbing manners, information, perhaps education; their black half-brothers and half-sisters stayed out in the plantation shacks. Several generations have elapsed since those days, but it is possible, even probable, that the descendants of mulattos have kept a step or two ahead of the descendants of the blacks in literacy, range of experience, and the like.

It is impossible to predict what the social effect of miscegenation will be. The effect undoubtedly varies and must be examined in each case. Thus, Indian half-breeds in one tribe may usually be the result of wholly transient or mercenary unions between inferior whites and debauched native women and may therefore grow up in an atmosphere of demoralization to which the full blooded Indian is less exposed. This demoralization would, to be sure, affect character and not intelligence as such; but it might stand in the way of schooling, and otherwise indirectly react on measurable traits of mind. In another tribe or section of a tribe, to the contrary, the half-breed might normally grow up in the house of a permanently settled white father, a squaw man, and in that event would learn English better, go to school earlier, and in case of a test therefore achieve a higher rating than the full blood.

44. Evidence from the Cultural Record of Races

An entirely different method of approach to the problem of race capacity is that of examining the cultural record, the achievements in civilization, of groups. While this approach is theoretically possible, and while it is often attempted, it is subject to little control and therefore unlikely to yield dependable conclusions.

First of all, the culture history record of a people must be known for considerable periods before one may validly think of inferring therefrom anything as to the faculties of that people. The reason is that active civilization, as a productive process, is slow to grow up, slow to be acquired. Mere momentum would normally keep the more advanced of two peoples ahead of the other for a long time. In proportion as not nations but groups of nations were involved, the momentum would continue for still longer periods. Civilization flourished for some thousands of years in the Near East, and then about the Mediterranean, before it became established with equal vigor and success in northern Europe. Had Julius Cæsar or one of his contemporaries been asked whether by any sane stretch of phantasy he could imagine the Britons and Germans as inherently the equals of Romans and Greeks, he would probably have replied that if these northerners possessed the ability of the Mediterraneans they would long since have given vent to it, instead of continuing to live in disorganization, poverty, ignorance, rudeness, and without great men or products of the spirit. And, within limits, Cæsar would have been right, since it was more than a thousand years before northern Europe began to draw abreast of Italy in degree and productivity of civilization. Two thousand years before Christ, a well informed Egyptian might reasonably have disposed in the same sweeping way of the possibility of Greeks and Italians being the equals of his own people in capacity. What had these barbarians ever done to lead one to think that they might yet do great things? To-day we brush Negroes and Indians out of the reckoning with the same offhandedness.

In general, arguing from performance to potentiality, from accomplishment to achievement, is valid under conditions of set experiment—such as are impossible for races—or in proportion as the number and variety of observations is large. A single matched competition may decide pretty reliably as between the respective speed capacities of two runners. But it would be hazardous to form an opinion from a casual glimpse of them in action, when one might happen to be hastening and the other dallying. Least of all would it be sound to infer that essential superiority rested with the one that was in advance at the moment of observation, without knowledge of their starting points, the difficulty of their routes, the motive or goal of their courses. It is only as the number of circumstances grows, from which observations are available, that judgment begins to have any weight. The runner who has led for a long time and is increasing his lead, or who has repeatedly passed others, or who carries a load and yet gains ground, may lay some claim to superiority. In the same way, as between races, a long and intimate historical record, objectively analyzed, gives some legitimate basis for tentative conclusions as to their natural endowment. But how long the record must be is suggested by the example already cited of Mediterranean versus Nordic cultural preëminence.

The fallacy that is most commonly committed is to argue from what in the history of great groups is only an instant: this instant being that at which one's own race or nationality is dominant. The Anglo-Saxon's moment is the present; the Greek's, the age of Pericles. Usually, too, the dominance holds only for certain aspects: military or economic or æsthetic superiority, as the case may be; inferiorities on other sides are merely overlooked. The Greek knew his venality, but looked down on the barbarian nevertheless. Anglo-Saxon failure in the plastic and musical arts is notorious, but does not deter most Anglo-Saxons from believing that they are the elect in quality, and from buttressing this conviction with the evidences of present industrial, economic, and political achievements—and perhaps past literary ones.

45. EMOTIONAL BIAS

Inference from record to potentiality where the record of one's own group is favorable, and failure to draw such inference where the achievement of other groups is superior, is a combination of mental operations that is widely spread because it arises spontaneously in minds not critically trained. Here is an instance:

One of the great achievements of science in the nineteenth century was Galton's demonstration, in a series of works beginning with "Hereditary Genius," that the laws of heredity apply to the mind in the same manner and to the same degree as to the body. On the whole this proof has failed to be recognized at its true importance, probably because it inclines adversely to current presuppositions of the independence of the soul from the body, and freedom of the will, propositions to which most men adhere emotionally.

From this perfectly valid demonstration, which has been confirmed by other methods, Galton went on to rate the hereditary worth of various races, according to the number of their men of genius. Here a fallacy enters: the assumption that all geniuses born are recognized as such. A great work naturally requires a great man, but it presupposes also a great culture. It may be that, historically speaking, a great genius cannot arise in a primitive degree of civilization. That is, the kind of concentrated accomplishment which alone we recognize as a work of genius is culturally impossible below a certain level. Biologically the individual of genius may be there; civilizationally he is not called forth, and so does not get into the record. Consequently it is unsound to argue from the historical record to biological worth. However, this Galton did; and his method led him to the conclusion that the negro rates two grades lower than the Englishman, on a total scale of fourteen grades, and the Englishman two lower than the fifth century Athenian.

This conclusion has never been popular. Most people on becoming familiar with Galton's argument, resist it. Its fallacy is not easy to perceive—if it were, Galton would not have committed it—and the average person is habitually so vague-minded upon what is organic and what is social, that the determination of the fallacy would be well beyond him. His opposition to Galton's conclusion is therefore emotionally and not rationally founded, and his arguments against the conclusion are presumably also called forth by emotional stimulus.

On the other hand, most individuals of this day and land do habitually infer, like Galton, from cultural status to biological worth, so far as the Negro is concerned. The same persons who eagerly accept the demonstration of a flaw in the argument in favor of Athenian superiority, generally become skeptical and resistive to the exposition of the same flaw in the current belief as to Negro inferiority. It is remarkable how frequently and how soon, in making this exposition, one becomes aware of the hearer's feeling that one's attitude is sophistical, unreal, insincere, or motivated by something concealed.

The drift of this discussion may seem to be an unavowed argument in favor of race equality. It is not that (§ 271). As a matter of fact, the bodily differences between races would appear to render it in the highest degree likely that corresponding congenital mental differences do exist. These differences might not be profound, compared with the sum total of common human faculties, much as the physical variations of mankind fall within the limits of a single species. Yet they would preclude identity. As for the vexed question of superiority, lack of identity would involve at least some degree of greater power in certain respects in some races. These preëminences might be rather evenly distributed, so that no one race would notably excel the others in the sum total or average of its capacities; or they might show a tendency to cluster on one rather than on another race. In either event, however, the fact of race difference, qualitative if not quantitative, would remain.

But it is one thing to admit this theoretical probability and then stop through ignorance of what the differences are, and another to construe the admission as justification of mental attitudes which may be well founded emotionally but are in considerable measure unfounded objectively.

In short, it is a difficult task to establish any race as either superior or inferior to another, but relatively easy to prove that we entertain a strong prejudice in favor of our own racial superiority.

46. Summary

It would seem that the subject of race problems, that is, the natural endowment of human races, can be summarized as follows:

The essential difficulty of these problems lies in the fact that the performance of groups is the product of two sets of factors, biological and cultural, both of which are variable and not always readily separable.

Progress in solution of the problems will be made gradually, and will be hastened by recognition of how few positive determinations have been made.

Most of the alleged existing evidence on race endowment is likely to be worthless.

The remainder probably has some value, but to what degree, and what it demonstrates, cannot yet be asserted.

The most definite determinations promise to eventuate from experiment. If fully controlled experiments in breeding and rearing human beings could be carried out, the problems would soon begin to solve. Experiments on animals would prove practically nothing because animals are cultureless—uninfluenced by social environment of their own making.

Progress will be aided by increasing shift of attention from the crude consideration of comparative lump rating of the races, that is, their gross superiority or inferiority, to a consideration of such specific qualitative differences as they may prove to show. The question of finding the race in which the greatest number of qualitative excellences are concentrated is subsequent and of much less scientific importance.

Scientific inquiries into race are for the present best kept apart from so-called actual race problems. These problems inevitably involve feeling, usually of considerable strength, which tends to vitiate objective approach. On the other hand, the practical problems will no doubt continue to be met practically, that is, morally and emotionally. Whether the Japanese should be forbidden to hold land and the Negro be legally disfranchised are problems of economics and of group ethics, which probably will for a long time be disposed of emotionally as at present, irrespective of the possible findings of science upon the innate endowment of Caucasian, Mongoloid, and Negroid strains.

CHAPTER V

LANGUAGE

47. Linguistic relationship: the speech family.—48. Criteria of relationship.—49. Sound equivalences and phonetic laws.—50. The principal speech families.—51. Classification of languages by types.—52. Permanence of language and race.—53. The biological and historical nature of language.—54. Problems of the relation of language and culture.—55. Period of the origin of language.—56. Culture, speech, and nationality.—57. Relative worth of languages.—58. Size of vocabulary.—59. Quality of speech sounds.—60. Diffusion and parallelism in language and culture.—61. Convergent languages.—62. Unconscious factors in language and culture.—63. Linguistic and cultural standards.—64. Rapidity of linguistic change.

47. LINGUISTIC RELATIONSHIP: THE SPEECH FAMILY

The question that the historian and anthropologist are likely to ask most frequently of the philologist, is whether this and that language are or are not related. Relationship in such connection means descent from a common source, as two brothers are descended from the same father, or two cousins from a common grandfather. If languages can be demonstrated to possess such common source, it is clear that the peoples who spoke them must at one time have been in close contact, or perhaps have constituted a single people. If, on the other hand, the languages of two peoples prove wholly dissimilar, though their racial types and cultures be virtually identical, as indeed is sometimes found to be the case—witness the Hungarians and their neighbors—it is evident that an element of discontinuous development must somewhere be reckoned with. Perhaps one part of an originally single racial group gradually modified its speech beyond recognition, or under the shock of conquest, migration, or other historical accident entirely discarded it in favor of a new and foreign tongue. Or the opposite may be true: the two groups were originally distinct in all respects, but, being brought in contact, their cultures interpenetrated, intermarriage followed, and the two physical types became assimilated into one while the languages remained dissimilar. In short, if one wishes full understanding of a people, one must take its language into consideration. This means that it must be classified. If a historical classification is to be more than barrenly logical, it must have reference to relationship, development, origin. In a word, it must be a genetic classification.

The term used to indicate that two or more languages have a common source but are unrelated to all others, or seem so in the present state of knowledge, is "linguistic family." "Linguistic stock" is frequently used as a synonym. This is the fundamental concept in the classification of languages. Without a clear idea of its meaning one involves himself in confusion on attempting to use philology as an aid to other branches of human history.

There is no abstract reason against referring to a group of unrelated languages as a "family" because they are all spoken in one area, nor against denominating as "families," as has sometimes been done, the major subdivisions of a group of languages admittedly of common origin. Again, languages that show certain similarities of type or structure, such as inflection, might conceivably be put into one "family." But there is this objection to all such usages: they do not commit themselves on the point of genetic relationship, or they contradict it, or only partially exhaust it. Yet commonness of origin is so important in many connections that it is indispensable to have one term which denotes its ascertainable presence. And for this quality there happens to be no generally understood designation other than "linguistic family," or its synonym, "linguistic stock." This phrase will therefore be used here strictly in the sense of the whole of a group of languages sprung from a single source, and only in that sense. Other groupings will be indicated by phrases like "languages of such and such an area," "sub-family," "division of a family," or "languages of similar type."

48. CRITERIA OF RELATIONSHIP

The question that first arises in regard to linguistic families is how the relationship of their constituent idioms is determined. In brief, the method is one of comparison. If a considerable proportion of the words and grammatical forms of two languages are reasonably similar, similar enough to indicate that the resemblances cannot be due to mere accident, these similar words and forms must go back to a common source, and if this source is not borrowing, the two tongues are related. If comparison fails to bring out any such degree of resemblance, the languages are classed in distinct families.

Of course it is possible that the reason two languages seem unrelated is not that they are really so, but that they have in the lapse of ages become so much differentiated that one cannot any longer find resemblance between their forms. In that event true relationship would be obscured by its remoteness. Theoretically there is high probability that many families of languages, customarily regarded as totally distinct, do go back in the far past to a common origin, and that ignorance of their history, or inability to analyze them deeply, prevents recognition of their relationship. From time to time it happens that groups of languages which at first seemed unrelated are shown by more intensive study to possess elements enough in common to compel the recognition of their original unity. In that case what were supposed to be several "families" become merged in one. The scope of a particular family may be thus enlarged; but the scope of the generic concept of "family" is not altered.

Whether there is any hope that comparative philology may ultimately be prosecuted with sufficient success to lead all the varied forms of human speech back to a single origin, is an interesting speculation. A fair statement is that such a possibility cannot be denied, but that the science is still far from such a realization, and that progress toward it is necessarily slow. Of more immediate concern is an ordering and summarizing of the knowledge in hand with a view to such positive inferences as can be drawn.

In an estimate of the similarity of languages, words that count as evidence must meet two requirements: they must be alike or traceably similar in sound; and they must be alike or similar in meaning. This double requirement holds, whether full words or separable parts of words, roots or grammatical forms, are compared. The English word *eel* and the French *île,* meaning island, are pronounced almost exactly alike, yet their meaning is so different that no sane person would regard them as sprung from the same origin. As a matter of fact *île* is derived from Latin *insula,* whereas *eel* has a cognate in German *aal.* These prototypes *insula* and *aal* being as different in sound as they are in meaning, any possibility that *eel* and *île* might be related is easily disposed of. Yet if the Latin and German equivalents were lost, if nothing were known of the history of the English and French languages, and if *île* meant not *island* but, say, *fish* or *watersnake,* then it might be reasonable to think of a connection.

Such doubtful cases, of which a certain proportion are likely to be adjudged wrongly, are bound to come up in regard to the less investigated languages, particularly those of nations without writing, the earlier stages of whose speech have perished without trace. In proportion as more is known of a language, or as careful analysis can reconstruct more of its past stages, the number of such borderline cases obviously becomes fewer.

Before genetic connection between two languages can be thought of, the number of their words similar in sound and sense must be reasonably large. An isolated handful of resemblances obviously are either importations—loan words—or the result of coincidence. Thus in the native Californian language known as Yuki, *ko* means *go,* and *kom* means *come.* Yet examination of Yuki reveals no further instances of the same kind. It would therefore be absurd to dream of a connection: one swallow does not make a summer. This lone pair of resemblances means nothing except that the mathematical law of probability has operated. Among the thousands of words in one language, a number are likely to be similar in sound to words of another language; and of this number again a small fraction, perhaps one or two or five in all, will happen to bear some resemblance in meaning also. In short, the similarities upon which a verdict of genetic relationship is based must be sufficiently numerous to fall well beyond possibility of mere coincidence; and it must also be possible to prove with reasonable certainty that they are not the result of one language borrowing words from another, as, for instance, English borrowed from French and Latin.

At the same time it is not necessary that the similarities extend to the point of identity. In fact, too close a resemblance between part of the stock of two languages immediately raises a presumption of borrowing. For every language is continually changing, and once a mother tongue has split into several branches, each of these goes on modifying its sounds, and gradually shifting the meaning of its words, generation after generation. In short, where connection is real, it must be veiled by a certain degree of distortion.

Take the English word *foot* and the Latin word of the same meaning, *pes*. To offhand inspection the sounds or forms of the two words do not seem similar. The resemblance becomes more definite in other forms of *pes*, for instance the genitive case *ped-is* or the accusative *ped-em*. Obviously the stem or elementary portion of the Latin word is not *pes* but *ped-;* and the *d* is closer to the English *t* of *foot* than is the *s* of *pes*. The probability of relationship is increased by the Greek word for foot, *pous*, whose stem proves to be *pod-*, with vowel closer to that of English. Meanwhile, it would be recognized that there are English words beginning with *ped-*, such as *pedal*, *pedestrian*, *pedestal*, all of which have a clear association with the idea of foot. All these words however possess almost exact equivalents in Latin. One would therefore be justified in concluding from these facts what indeed the history of the languages proves, namely, that *pedal*, *pedestrian*, and *pedestal* are Latin words taken over into English; whereas *foot* and *pes* and *pous*, and for that matter German *Fuss*, are derivatives from a common form which once existed in the now extinct mother tongue from which Greek and Latin and English and German are derived.

49. Sound Equivalences and Phonetic Laws

The question next arises whether it is possible to account for the distortions which have modified the original word into *foot*, *ped-*, etc. What has caused the initial sound of this ancient word to become *p* in Latin and *f* in English, and its last consonant to be *d* in Latin and Greek, *t* in English, and *ss* in German? To answer this seemingly innocent question with accuracy for this one word alone would involve a treatise on the whole group of languages in question, and even then the causes, as causes, could scarcely be set down with certainty. But it has proved possible to assemble a large number of instances of parallel distortion in which Latin *p* corresponds to English *f*, or *d* to *t*. Evidently philology has got hold of a generalized phenomenon here. Since *father* corresponds to *pater, full* to *pl-enus, for* to *pro, fish* to *piscis,* and so on in case after case, we are evidently face to face with a happening that has occurred with regularity and to which the name "law" is therefore applicable.

The *f* of *foot* and *p* of *pes* are both lip sounds. They differ preëminently in that *f* can be prolonged indefinitely, whereas *p* is a momentary sound. It is produced by closure of the lips for a fraction of a second during which there is an interruption of sound production, followed by a somewhat explosive release of the breath which has been impounded in the mouth cavity. This explosion is of necessity instantaneous. Since it is preceded by occlusion, or stoppage of the breath, it is customary to speak of sounds produced by a process like *p* as "stops." *F,* on the other hand, is a "continuant," or more specifically a "fricative."

The English word *three* begins with a sound which, although conventionally represented by the two letters *th,* is a simple sound and in a class with *f* in being fricative. *Th* is formed by putting the tongue lightly across the teeth, just as *f* is made by placing the lower lip against the edge of the upper teeth. In both cases the breath is expelled with friction through a narrow passage. Now if the fricative *f* is represented in Latin by the stop *p,* then, if regularity holds good, the English fricative *th* ought to be represented in Latin by the stop sound in the corresponding dental position, namely *t*. The Latin word for *three* is in fact *tres;* for *thin, ten-uis;* for *mother, mater;* for *thou, tu,* and so on. The regularity therefore extends beyond the limits of the single labial class of sounds, and applies with equal force to the dentals; and, it may be added, to the palatals or gutturals as well.

As one passes from English and Latin to German, one finds the initial sound of the word meaning three, *drei,* to be somewhat different from *th* and *t* but still clearly allied, since it also is made by the tongue against the teeth. *D* is a stop like *t,* but the vocal cords vibrate while it is being pronounced, whereas in *t* the vocal cords are silent. *D* is "voiced" or "sonant," *t* "unvoiced" or "surd." Hence the formulation: Latin, surd stop; German, sonant stop; English, fricative. This triple equivalence can be substantiated in other words. For instance, *ten-uis, dünn, thin; tu, du, thou.*

If it is the English word that contains a surd stop, what will be the equivalent in Latin and German? Compare *ten,* Latin *decem,* German *zehn.* Again the three classes of sounds run parallel; but the place of their appearance in the three languages has shifted.

The third possible placing of the three sounds in the three languages is when English has the sonant stop, *d.* By exclusion it might be predicted that Latin should then show the fricative *th* and German the surd stop *t.* The word *daughter* confirms. The German is *tochter.* Latin in this case fails us, the original corresponding stem having gone out of use and been replaced by the word *filia.* But Greek, whose sounds align with those of Latin as opposed to English and German, provides the *th* as expected: *thygater.*

Let us bring together these results so that the eye may grasp them:

Latin, Greek	surd stop	sonant stop	fricative
German	sonant stop	fricative	surd stop
English	fricative	surd stop	sonant stop

Latin, Greek	tres	duo	thygater
German	drei	zwei	tochter
English	three	two	daughter

These relations apply not only to the dentals *d, t, th* (*z*), which have been chosen for illustration, but also to the labials, *p, b, f,* and to the palatals *k, g, h* (*gh, ch*).

It is evident that most of the sounds occur in all three groups of languages, but not in the same words. The sound *t* is common to English, Latin, and German, but when it appears in a particular word in one of these languages it is replaced by *d* and *th* in the two others. This replacing is known as a "sound shift." The sound shifts just enumerated constitute the famous Grimm's Law. This was the first discovered important phonetic law or system of sound substitutions. Yet it is only one of a number of shifts that have been worked out for the Indo-

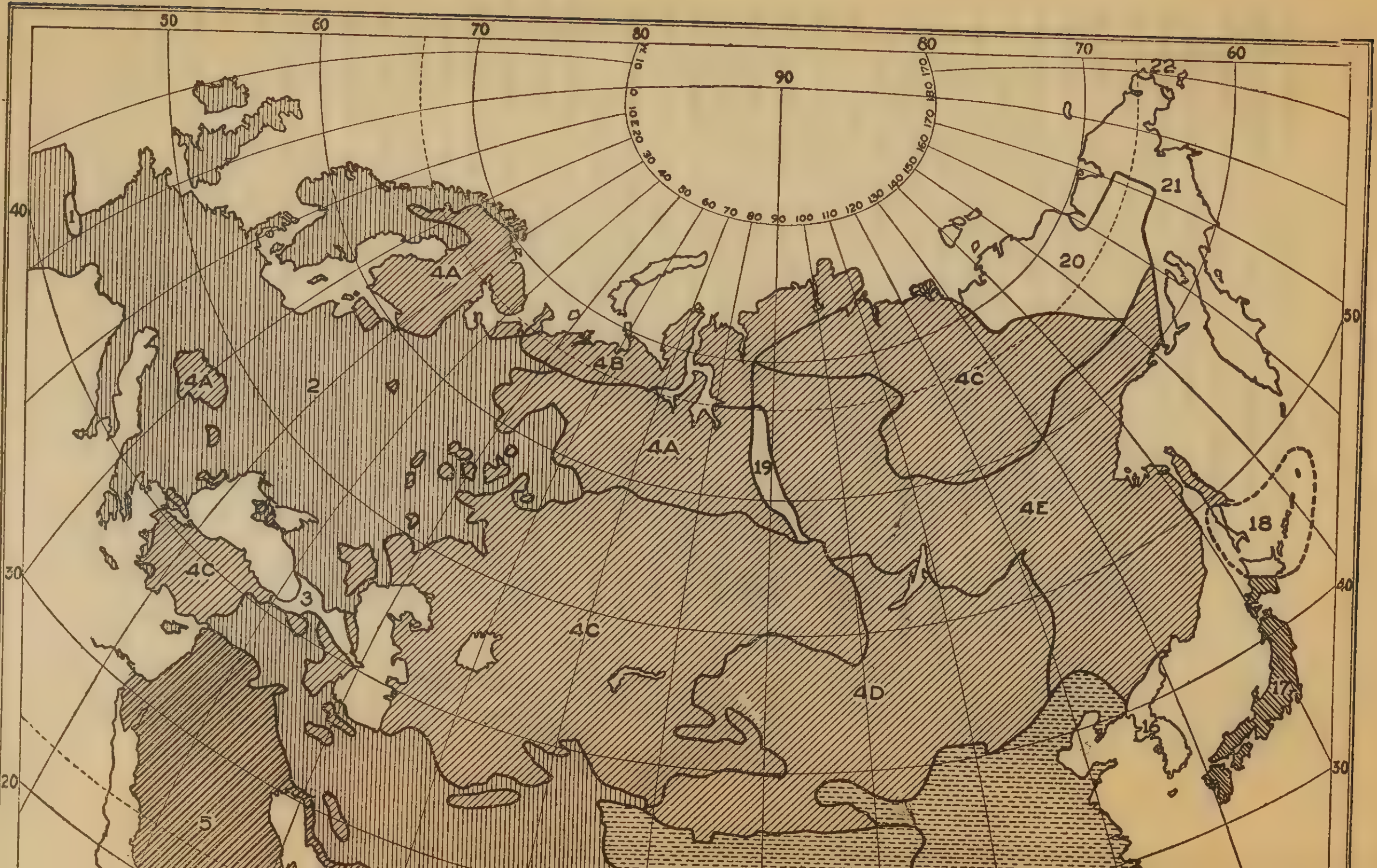
European group of languages to which English, German, and Latin belong. So far, only stopped and fricative consonants have been reviewed here, and no vowels have been considered. Other groups of languages also show shifts, but often different ones, as between *l* and *n*, or *s* and *k*, or *p* and *k*.

The significance of a shift lies in the fact that its regularity cannot be explained on any other ground than that the words in which the law is operative must originally have been the same. That is, Latin *duo,* German *zwei,* English *two* are all only variants of a word which meant "two" in the mother tongue from which these three languages are descended. This example alone is of course insufficient evidence for the existence of such a common mother tongue. But that each of the shifts discussed is substantiated by hundreds or thousands of words in which it holds true, puts the shift beyond the possibility of mere accident. The explanation of coincidence is ruled out. The resemblances therefore are both genuine and genetic. The conclusion becomes inevitable that the languages thus linked are later modifications of a former single speech.

It is in this way that linguistic relationship is determined. Where an ancient sound shift, a law of phonetic change, can be established by a sufficient number of cases, argument ceases. It is true that when most of a language has perished, or when an unwritten language has been but fragmentarily recorded or its analysis not carried far, a strong presumption of genetic unity may crowd in on the investigator who is not yet in a position to present the evidence of laws. The indications may be strong enough to warrant a tentative assumption of relationship. But the final test is always the establishment of laws of sound equivalence that hold good with predominating regularity.

50. THE PRINCIPAL SPEECH FAMILIES

The number of linguistic families is not a matter of much theoretical import. From what has already been said it appears that the number can perhaps never be determined with absolute accuracy. As knowledge accumulates and dissection is carried to greater refinements, new phonetic laws will uncover and serve to unite what now seem to be separate stocks. Yet for the prac-



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tical purpose of classification and tracing relationship the linguistic family will remain a valuable tool. A rapid survey of the principal families is therefore worth while.

In Asia and Europe, which must be considered a unit in this connection, the number of stocks, according to conservative reckoning, does not exceed twenty-five. The most important of these, in point of number of speakers, is the Indo-European or Indo-Germanic or Aryan family, whose territory for several thousand years has comprised southwestern Asia and the greater part, but by no means all, of Europe. The most populous branches of the Indo-European family are the Indic, Slavic, Germanic, and Romance or Latin. Others are Persian or Iranic, Armenian, Greek, Albanian, Baltic or Lithuanian, and Keltic. From Europe various Indo-European languages, such as English, Spanish, French, Russian, have in recent centuries been carried to other continents, until in some, such as the Americas and Australia, the greater area is now inhabited by peoples speaking Indo-European. As the accompanying maps are intended to depict the historic or native distribution of languages they do not show this diffusion. It will be noted that the distribution of Indo-European has the form of a long belt stretching from western Europe to northeastern India, with an interruption only in Asia Minor (Fig. 12). Turkish peoples displaced Indo-Europeans there about a thousand years ago, thus breaking the territorial continuity. It is probable that another link between the western and eastern Indo-Europeans once stretched around the north of the Caspian sea. Here also there are Turks now.

Almost equaling Indo-European in the number of its speakers is Sinitic, which is generally held to include Chinese proper with its dialects; the Tibeto-Burman branch; the T'ai or Shan-Siamese branch; and probably some minor divisions like Lolo.

In extent of territory occupied the Altaic stock rivals the Indo-European. Its three main divisions, Turkish, Mongolian, and Tungus-Manchu, cover most of northern and central Asia and some tracts in Europe. The Turks, as just noted, are the only stock that within the period of history has gained appreciable territory at Indo-European expense. The Uralic or Finno-Ugric family has eastern Europe and northwestern Asia as its home, with the Finns and Hungarian Magyars as its most civilized and best known representatives. This is a scattered stock. Most scholars unite the three Altaic divisions, Finno-Ugric, and Samoyed into a vast Ural-Altaic family.

Of the Semitic family, Arabic is the chief living representative, with Abyssinian in Africa as a little known half-sister. Arabic is one of the most widely diffused of all languages, and as the orthodox vehicle of Mohammedanism has served an important function as a culture carrier. Several great nations of ancient times also spoke Semitic tongues: the Babylonians, Assyrians, Phœnicians, Carthaginians, and Hebrews.

Southern India is Dravidian. While people of this family enter little into our customary thoughts, they number over fifty millions. Japanese and Korean also merit mention as important stock tongues. Anamese, by some regarded as an offshoot from Chinese, may constitute a separate stock. Several minor families will be found on the Asiatic map, most of them consisting of uncivilized peoples or limited in their territory or the number of their speakers. Yet, so far as can be judged from present knowledge, they form units of the same order of independence as the great Indo-European, Semitic, and Ural-Altaic stocks.

Language distributions in Africa are in the main simple (Fig. 13). The whole of northern Africa beyond latitude 10°, and parts of east Africa almost to the equator, were at one time Hamitic. This is the family to which the language of ancient Egypt belonged. Hamitic and Semitic, named after sons of Noah, probably derive from a common source, although the separation of the common mother tongue into the African Hamitic and the Asiatic Semitic divisions must have occurred very anciently. In the past thousand years Hamitic has yielded ground before Semitic, due to the spread of Arabic in Mohammedan Africa.

Africa south of the equator is the home of the great Bantu family, except in the extreme southwest of the continent. There a tract of considerable area, though of small populational density, was in the possession of the backward Bushmen and Hottentots, distinctive in their physical type as well as languages.

Between the equator and latitude ten north, in the belt known as the Sudan, there is much greater speech diversity than elsewhere in Africa. The languages of the Sudan fall into several families, perhaps into a fairly large number. Opinion conflicts or is unsettled as to their classification. They are, at least in the main, non-Hamitic and non-Bantu; but this negative fact does not preclude their having had either a single or a dozen origins. It has usually been easier to throw them all into a

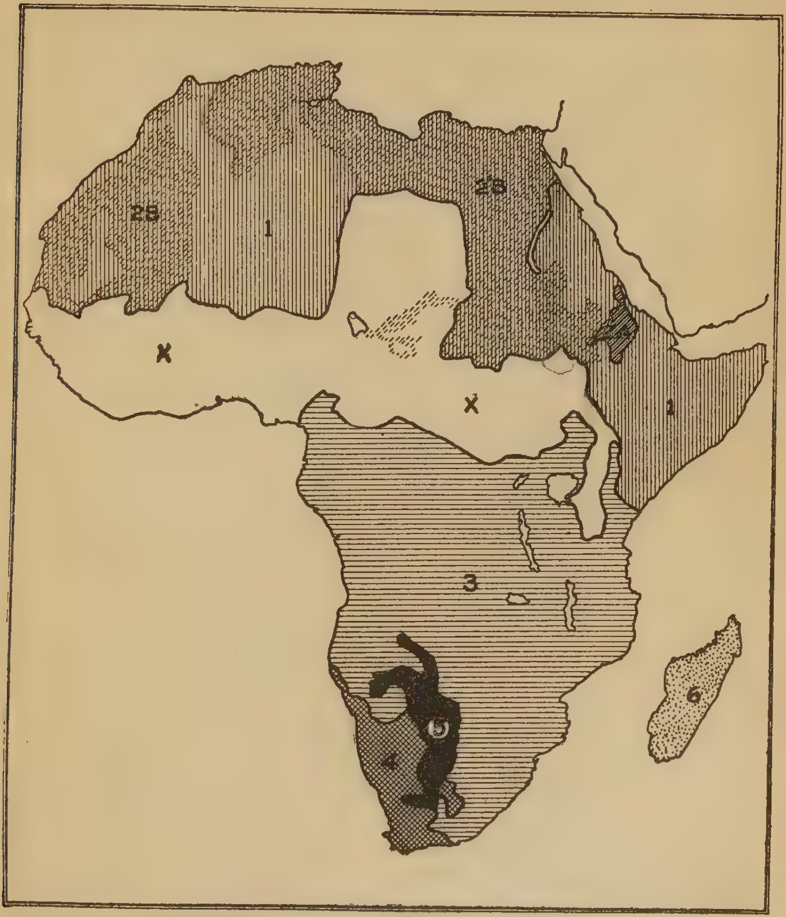

Fig. 13. Linguistic Families of Africa. 1, Hamitic. 2, Semitic (a, old; b, intrusive in former Hamitic territory since Mohammed). 3, Bantu. 4, Hottentot. 5, Bushman. 6, Malayo-Polynesian. X, the Sudan, not consistently classified.

vague group designated as non-Hamitic and non-Bantu than to compare them in detail.

In Oceania conditions are similar to those of Africa, in that there are a few great, widely branching stocks and one rather small area, New Guinea, of astounding speech diversity. Indeed, superficially this variety is the outstanding linguistic feature of New Guinea. The hundreds of Papuan dialects of the island look as if they might require twenty or more families to accommodate them. However, it is inconceivable that so small a population should time and again have evolved totally new forms of speech. It is much more likely that something in the mode of life or habits of mind of the Papuans has favored the breaking up of their speech into local dialects and an unusually rapid modification of these into markedly differentiated languages. What the circumstances were that favored this tendency to segregation and change can be only conjectured. At any rate, New Guinea ranks with the Sudan, western North America, and the Amazonian region of South America, as one of the areas of greatest linguistic multiplicity.

All the remainder of Oceania is either Australian or Malayo-Polynesian in speech. The Australian idioms have been imperfectly recorded. They were numerous and locally much varied, but seem to derive from a single mother tongue.

All the East Indies, including part of the Malay Peninsula, and all of the island world of the Pacific—Polynesia, Micronesia, and Melanesia—always excepting interior New Guinea—are the habitat of the closely-knit Malayo-Polynesian family, whose unity was quickly recognized by philologists. From Madagascar to Easter Island this speech stretches more than half-way around our planet. Some authorities believe that the Mon-Khmer languages of southern Indo-China and the Kolarian or Munda-Kol tongues of India are related in origin to Malayo-Polynesian, and denominate the larger whole, the Austronesian family.

North and South America, according to the usual reckoning, contain more native language families than all the remainder of the world. The orthodox classification allots about seventy-five families to North America (some fifty of them represented within the borders of the United States) and another seventy-

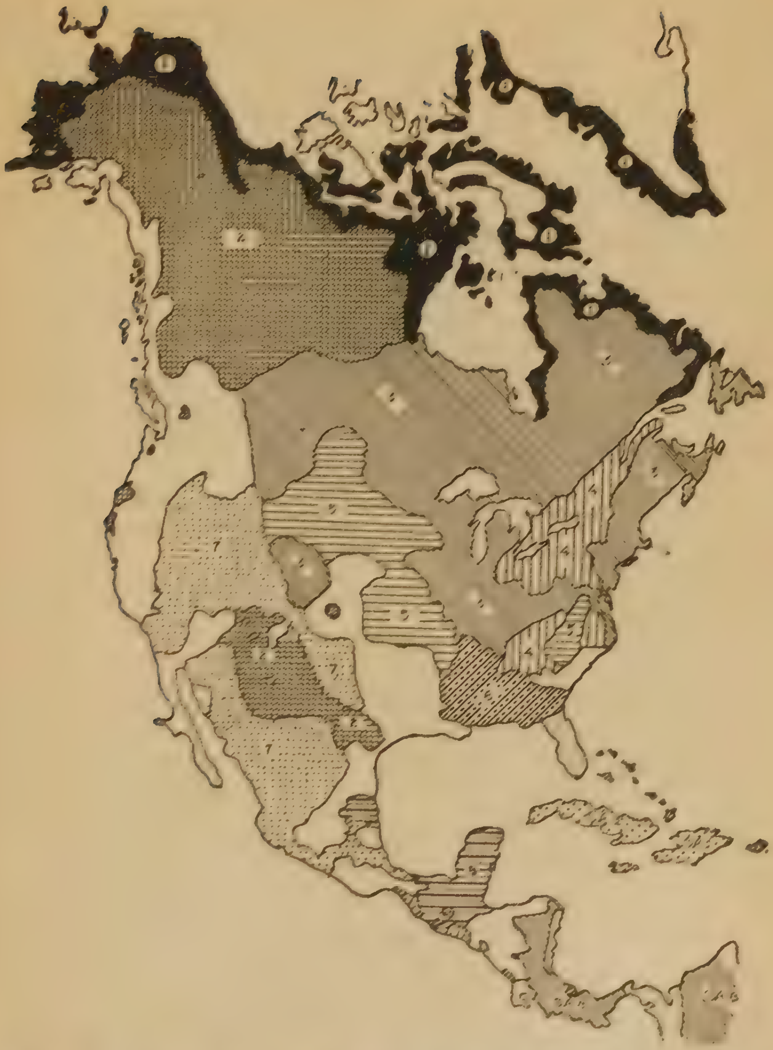

FIG. 14. Some important linguistic families of North America: 1, Eskimo; 2, Athabascan; 3, Algonkin; 4, Iroquoian; 5, Siouan; 6, Muskogean; 7, Uto-Aztecan; 8, Mayan. SA1, Arawak, No. 1 on South American map (Fig. 15). SA8, Chibcha, No. 8 on South American map. The white areas are occupied by nearly seventy smaller families, according to the classification usually accepted.

five to South America. They varied greatly in size at the time of discovery, some being confined to a few hundred souls, whereas others stretched through tribe after tribe over enormous areas. Their distribution is so irregular and their areas so disproportionate as to be impossible of vivid representation except on a large-scale map in colors. The most important in extent of territory, number of speakers, or the cultural importance of the nations adhering to them, are, in North America, Eskimo, Athabascan, Algonkin, Iroquoian, Muskogean, Siouan, Uto-Aztecan, Maya; and in South America, Chibcha, Quechua, Aymara, Araucanian, Arawak, Carib, Tupi, Tapuya. It will be seen on the maps (Figs. 14, 15) that these sixteen groups held the greater part of the area of the double continent, the remaining smaller areas being crowded with about ten times as many stocks. Obviously, as in New Guinea, there cannot well have been such an original multiplicity; in fact, recent studies are tending to consolidate the hundred and fifty New World families into considerably fewer groups. But the evidence for such reductions is necessarily difficult to bring and much of it is still incomplete. The stocks mentioned above have been long determined and generally accepted.

About a third of humanity to-day speaks some form of Indo-European. A quarter talks some dialect of Sinitic stock. Semitic, Dravidian, Ural-Altaic, Japanese, Malayo-Polynesian, Bantu have each from about fifty to a hundred million speakers. The languages included in these eight families form the speech of approximately ninety per cent of living human beings.

51. Classification of Languages by Types

A classification is widely prevalent which puts languages according to their structure into three types: inflective, agglutinating, and isolating. To this some add a fourth type, the polysynthetic or incorporating. While the classification is largely misrepresentative, it enters so abundantly into current thought about human speech that it is worth presenting, analyzing, and, so far as it is invalid, refuting.

An inflecting language expresses relations or grammatical form by adding prefixes or suffixes which cannot stand alone,

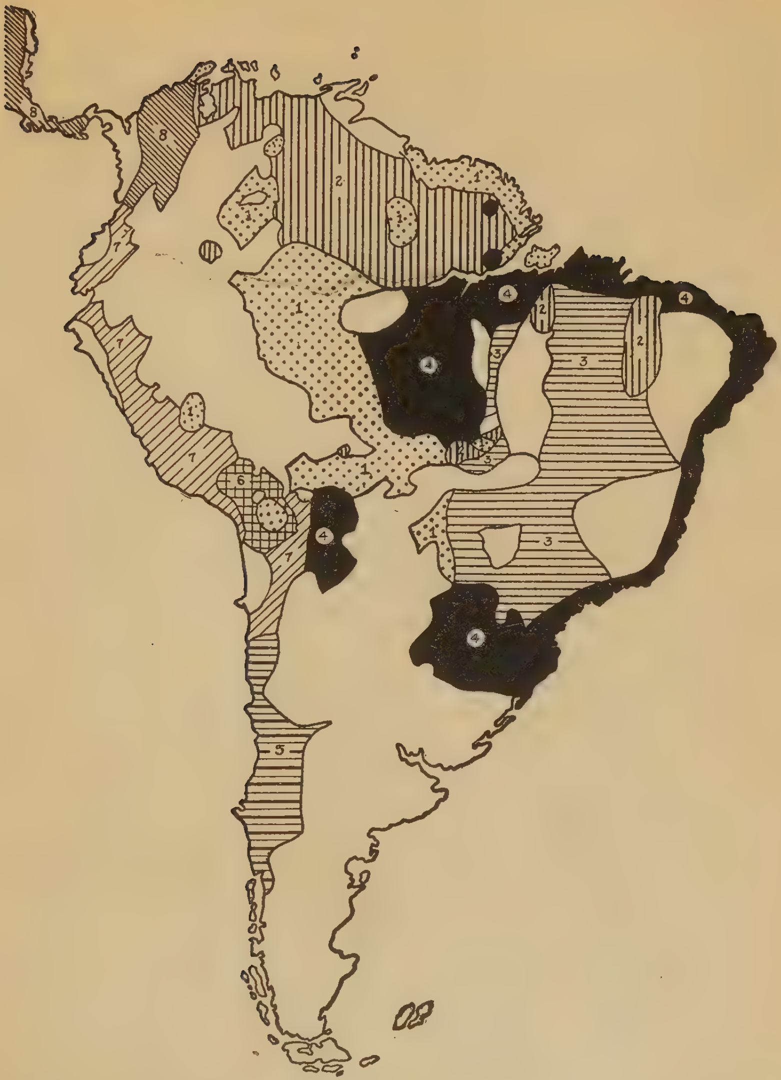

Fig. 15. Some important linguistic families of South America: 1, Arawak; 2, Carib; 3, Tapuya; 4, Tupi; 5, Araucanian; 6, Aymara; 7, Quechua (Inca); 8, Chibcha. The white areas are occupied by about seventy smaller families, according to the usually accepted classification. (Based on Chamberlain.)

or if they stood alone would mean nothing; or that operates by internal modifications of the stem, which also can have no independent existence. The *-ing* of *killing* is such an inflection; so are the vowel changes and the ending *-en* in the conjugation *write, wrote, written.*

An isolating language expresses such relations or forms by separate words or isolated particles. English *heart of man* is isolating, where the Latin equivalent *cor hominis* is inflective, the per se meaningless suffix *-is* rendering the genitive or possessive force of the English word *of.*

An agglutinative language glues together into solid words elements for which a definite meaning of their own can be traced. English does not use this mechanism for purposes that are ordinarily reckoned as strictly grammatical, but does employ it for closely related purposes. *Under-take, rest-less,* are examples; and in a form like *light-ly,* which goes back to *light-like,* the force of the suffix which converts the adjective into the adverb is of a kind that in descriptions of most languages would be considered grammatical or formal.

Polysynthetic languages are agglutinative ones carried to a high pitch, or those that can compound words into equivalents of fair sized sentences. *Steam-boat-propeller-blade* might be called a polysynthetic form if we spoke or wrote it in one word as modern German and ancient Greek would.

Incorporating languages embody the object noun, or the pronoun representing it, into the word that contains the verb stem. This construction is totally foreign to English.[1]

Each of these classes evidently defines one or more distinctive linguistic processes. There are different mechanisms at work in *kill-ing, of man, light-ly.* The distinction is therefore both valid and valuable. Its abuse lies in trying to slap the label of one type on a whole language. The instances given show that English employs most of the several distinct processes. Obviously it would be arbitrary to classify English as outright of one type. This is also the situation for most other languages. There are a few languages that tend prevailingly in one direction or the other: Sanskrit and Latin and Hebrew toward the inflective structure, Turkish toward the agglutinative, Chinese toward the isolating. But they form a small minority, and most of them contain certain processes of types other than their predominating ones. Sanskrit, for instance, has polysynthetic traits, Hebrew incorporating ones. Therefore, so long as these concepts are used to picture a language in detail, with balanced recognition of the different processes employed by it, they are valuable tools to philological description. When on the other hand the concepts are degraded into catchwords designating three or four compartments into one of which every language is somehow to be stuffed, they grossly misrepresent most of the facts. The concepts, in short, apply usefully to types of linguistic processes, inadequately to types of languages.

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[1] Noun incorporation is really an etymological process rather than a grammatical one. In most cases it is the result of a language permitting compounds of nouns with verbs, or verbs with verbs, to form verbs: "to rabbit-kill," "to run-kill," and so on. This construction, which is perfectly natural and logical, happens to be so alien to the genius of the Indo-European languages that it has been singled out as far more notable and significant than it deserves. Pronominal incorporation is discussed below (§ 60).

Why then has the classification of human languages into inflecting, agglutinating, isolating, and polysynthetic or incorporating ones been repeated so often? First of all, because languages vary almost infinitely, and a true or natural classification, other than the genetic one into families, is intricate. The mind craves simplicity and the three or four supposedly all-embracing types are a temptation.

A second reason lies deeper. As philology grew up into a systematic body of knowledge, it centered its first interests on Latin and Greek, then on Sanskrit and the other older Indo-European languages. These happened to have inflective processes unusually well developed. They also happened to be the languages from which the native speech of the philologists was derived. What is our own seems good to us; consequently Indo-European was elevated into the highest or inflective class of languages. As a sort of after-thought, Semitic, which includes Hebrew, the language of part of our Scriptures, was included. Then Chinese, which follows an unusually simple plan of structure that is the opposite in many ways of the complex structure of old Indo-European, and which was the speech of a civilized people, was set apart as a class of the second rank. This left the majority of human languages to be dumped into a third class, or a third and fourth class, with the pleasing implication that they were less capable of abstraction, more materialistic, cruder, and generally inferior. Philologists are customarily regarded as extreme examples of passionless, dry, objective human beings. The history of this philological classification indicates that they too are influenced by emotional and self-complacent impulses.

52. PERMANENCE OF LANGUAGE AND RACE

It is sometimes thought because a new language is readily learned, especially in youth, that language is a relatively unstable factor in human history, less permanent than race. It is necessary to guard against two fallacies in this connection. The first is to argue from individuals to societies; the second, that because change is possible, it takes place.

As a matter of fact, languages often preserve their existence, and even their territory, with surprising tenacity in the face of conquest, new religions and culture, and the economic disadvantages of unintelligibility. To-day, Breton, a Keltic dialect, maintains itself in France as the every-day language of the people in the isolated province of Brittany—a sort of philological fossil. It has withstood the influence of two thousand years of contact, first with Latin, then with Frankish German, at last with French. Its Welsh sister-tongue flourishes in spite of the Anglo-Saxon speech of the remainder of Great Britain. The original inhabitants of Spain were mostly of non-Aryan stock. Keltic, Roman, and Gothic invasions have successively swept over them and finally left the language of the country Romance, but the original speech also survives the vicissitudes of thousands of years and is still spoken in the western Pyrenees as Basque. Ancient Egypt was conquered by the Hyksos, the Assyrian, the Persian, the Macedonian, and the Roman, but whatever the official speech of the ruling class, the people continued to speak Egyptian. Finally, the Arab came and brought with him a new religion, which entailed use of the Arabic language. Egypt has at last become Arabic-speaking, but until a century or two ago the Coptic language, the daughter of the ancient Egyptian tongue of five thousand years ago, was kept alive by the native Christians along the Nile, and even to-day it survives in ritual. The boundary between French on the one side and German, Dutch, and Flemish on the other, has been accurately known for over six hundred years. With all the wars and conquests back and forth across the speech line, endless political changes and cultural influences, this line has scarcely anywhere shifted more than a few dozen miles, and in places has not moved by a comfortable afternoon's stroll.

While populations can learn and unlearn languages, they tend to do so with reluctance and infinite slowness, especially while they remain in their inherited territories. Speech tends to be one of the most persistent ethnic characters.

In general, where two populations mingle, the speech of the more numerous prevails, even if it be the subject nationality. A wide gap in culture may overcome the influence of the majority, yet the speech of a culturally more active and advanced population ordinarily wrests permanent territory to itself slowly except where there is an actual crowding out or numerical swamping of the natives. This explains the numerous survivals and ''islands'' of speech: Keltic, Albanian, Basque, Caucasian, in Europe; Dravidian and Kolarian in India; Nahuatl and Maya and many others in modern Mexico; Quechua in Peru; Aymara in Bolivia; Tupi in Brazil. There are cases to the contrary, like the rapid spread of Latin in most of Gaul after Cæsar's conquest, but they seem exceptional.

As to the relative permanence of race and speech, everything depends on the side from which the question is approached. From the point of view of hereditary strains, race must be the more conservative, because it can change rapidly only through admixture with another race, whereas a language may be completely exchanged in a short time. From the point of view of history, however, which regards human actions within given territories, speech is often more stable. Wars or trade or migration may bring one racial element after another into an area until the type has become altered or diluted, and yet the original language, or one directly descended from it, remains. The introduction of the negro from Africa to America illustrates this distinction. From the point of view of biology, the negro has at least partially preserved his type, although he has taken on a wholly new language. As a matter of history, the reverse is true: English continues to be the speech of the southern United States, whereas the population now consists of two races instead of one, and the negro element has been altered by the infusion of white blood. It is a fallacy to think, because one can learn French or become a Christian and yet is powerless to change his eye color or head shape, that language and culture are altogether less stable than race. Speech and culture have an existence of their own, whose integrity does not depend on hereditary integrity. The two may move together or separately.

53. The Biological and Historical Nature of Language

It is a truism, but one important never to forget in the study of man, that the faculty of speech is innate, but every language wholly acquired. Moreover, the environment of which languages are the product is not a natural one, that is, geographic or climatic, but social. All words and speech forms that are learned—and they constitute almost the complete mass of language—are imitated directly from other human beings. Those new forms that from time to time come into use rest on existing speech material, are shaped according to tendencies already operative although perhaps more or less hidden, cannot generally be attributed, as regards origin, or at least entire origin, to single individuals; in short, present a history similar to that of inventions and new institutions. Language thus is a superorganic product; which of course does not contradict—in fact implies—that it rests on an organic basis.

The "speech" of the animals other than man has something in common with human languages. It consists of sounds produced by the body, accompanied by certain mental activities or conditions, and capable of arousing certain definite responses in other individuals of the species. It differs from human speech in several fundamental particulars. First of all, the cries and calls and murmurs of the brutes appear to be wholly instinctive. A fowl raised alone in an incubator will peep and crow or cluck as it will scratch and peck. A dog reared by a foster cat will bark, or growl, or whine, or yelp, when it has attained the requisite age, and on application of the proper stimulus, as he will wag or crouch or hunt or dig, and no differently from the dog brought up in association with other dogs. By contrast, the Japanese infant turned over to American foster parents never utters or knows a single Japanese word, learns only English, and learns that as well as do his Caucasian step-brothers. Evidently then, animal speech is to all intents wholly organic and not at all ''social'' in the sense of being superorganic. If this summary is not absolutely exact, it departs from the truth only infinitesimally.

Further, animal speech has no ''meaning,'' does not serve as a vehicle of ''communication.'' The opposite is often assumed popularly, because we anthropomorphize. If it is said that a dog's growl ''means'' anger, and that his bark ''communicates'' suspicion or excitement to his fellows, the words are used in a sense different from their significance when we say that the term *red* ''means'' the color at one end of the spectrum, or that a message of departure ''communicates'' information. The animal sounds convey knowledge only of subjective states. They ''impart'' the fact that the utterer feels anger, excitement, fear, pain, contentment, or some other affect. They are immediate reflex responses to a feeling. They may be ''understood'' in the sense that a sympathetic feeling is evoked or at any rate mobilized; and thereby they may lead or tend to lead to action by the hearers. In the same way, any man instinctively ''understands'' the moan of a fellow human being. But the moan does not tell whether the pain is of a second's or a week's duration, due to a blow or to gas in the bowel, to an ulcerated tooth or to mental anguish. There is no communication of anything objective, of ideas as distinct from feelings, as when we say *red* or *break* or *up* or *water*. Not one of these simple concepts can be communicated as such by any brute speech.

One consequence is the ''arbitrariness'' of human speech. Why should the sound-cluster *red* denote that particular color rather than green? Why does the same word often designate quite distinct ideas in different languages—the approximate sound group *lay* meaning ''milk'' in French; *lass* ''a girl'' in English, ''tired'' in French, ''allow'' in German? Such facts are physiologically arbitrary; just as it is physiologically arbitrary and organically meaningless that Americans live in a republic and Britons under a monarchy, or that they turn respectively to the right and left on the road. Phenomena like these have other social, cultural, or superorganic phenomena as their immediate causes or antecedents. In the light of such antecedents, viewed on the level of history, these phenomena are intelligible: we know why the United States is a republic, we can trace the development of words like *lay* and *lass*. It is only from the biological plane that such facts seem insignificant or arbitrary.

54. Problems of the Relation of Language and Culture

This association of language and civilization, or let us say the linguistic and non-linguistic constituents of culture, brings up the problem whether it would be possible for one to exist without the other. Actually, of course, no such case is known. Speculatively, different conclusions might be reached. It is difficult to imagine any generalized thinking taking place without words or symbols derived from words. Religious beliefs and certain phases of social organization also seem dependent on speech: caste ranking, marriage regulations, kinship recognition, law, and the like. On the other hand, it is conceivable that a considerable series of inventions might be made, and the applied arts might be developed in a fair measure by imitation, among a speechless people. Finally there seems no reason why certain elements of culture, such as music, should not flourish as successfully in a society without as with language.

For the converse, a cultureless species of animal might conceivably develop and use a form of true speech. Such communications as "The river is rising," "Bite it off," "What do you find inside?" would be within the range of thought of such a species. Why then have even the most intelligent of the brutes failed to develop a language? Possibly because such a language would lack a definite survival value for the species, in the absence of accompanying culture.

On the whole, however, it would seem that language and culture rest, in a way which is not yet fully understood, on the same set of faculties, and that these, for some reason that is still more obscure, developed in the ancestors of man, while remaining in abeyance in other species. Even the anthropoid apes seem virtually devoid of the impulse to communicate, in spite of freely expressing their affective states of mind by voice, facial gesture, and bodily movement. The most responsive to man of all species, the dog, learns to accept a considerable stock of culture in the sense of fitting himself to it: he develops conscience and manners, for example. Yet, however highly bred, he does not hand on his accomplishments to his progeny, who again depend on their human masters for what they acquire. A group of the best reared dogs left to themselves for a few years would lose all their politeness and revert to the predomestic habits of their species. In short, the culture impulse is lacking in the dog except so far as it is instilled by man; and in most animals it can notoriously be instilled only to a very limited degree. In the same way, the impulse toward communication can be said to be wanting. A dog may understand a hundred words of command and express in his behavior fifty shades of emotion; only rarely does he seem to try to communicate information of objective fact. Very likely we are attributing to him even in these rare cases the impulse which we should feel. In the event of a member of the family being injured or lost, it is certain that a good dog expresses his agitation, uneasiness, disturbed attachment; but much less certain is it that he intends to summon help, as we spontaneously incline to believe because such summoning would be our own reaction to the situation.

The history and causes of the development in incipient man of the group of traits that may be called the faculties for speech and civilization remain one of the darkest areas in the field of knowledge. It is plain that these faculties lie essentially in the sphere of what is ordinarily called the mind, rather than in the body, since men and the apes are far more similar in their general physiques than they are in the degree of their ability to use their physiques for non-physiological purposes. Or, if this antithesis of physical and mental seem unfortunate, it might be said that the growth of the faculties for speech and culture was connected more with special developments of the central nervous system than with those of the remainder of the body.

55. Period of the Origin of Language

Is, then, human language as old as culture? It is difficult to be positive, because words perish like beliefs and institutions, whereas stone tools endure as direct evidence. On the whole, however, it would appear that the first rudiments of what deserves to be called language are about as ancient as the first culture manifestations, not only because of the theoretically close association of the two phases, but in the light of circumstantial testimony, namely the skull interiors of fossil men. In Piltdown as well as Neandertal man, those brain cortex areas in which the nervous activities connected with auditory and motor speech are most centralized in modern man, are fairly well developed, as shown by casts of the skull interiors, which conform closely to the brain surface. The general frontal region, the largest area of the cortex believed to be devoted to associative functions—in loose parlance, to thought—is also greater than in any known ape. More than one authority has therefore felt justified in attributing speech to the ancestors of man that lived well back in the Pleistocene. The lower jaws of Piltdown and in a measure of Heidelberg man, it is true, are narrow and chinless, thus leaving somewhat less free play to the tongue than living human races enjoy. But this factor is probably of less importance than the one of mental facultative development. The parrot is lipless and yet can reproduce the sounds of human speech. What he lacks is language faculty; and this, it seems, fossil man already had in some measure.

56. Culture, Speech, and Nationality

This point of view raises the question whether one ought to speak of language and culture or rather of language as a part of culture. So far as the process of their transmission is concerned, and the type of mechanism of their development, it is clear that language and culture are one. For practical purposes it is generally convenient to keep them distinct. There is no doubt that two peoples can share in what is substantially the same culture and yet speak fundamentally different idioms; for instance, the Finno-Ugric Magyars or Hungarians among the adjacent Slavs, Germans, and Latins of central Europe, who are all Indo-Europeans. The other way around, the northern Hindus and west Europeans are certainly different culturally, yet their languages go back to a common origin. In fact it has become a commonplace that the arguing of connection between the three factors of race, language, and culture (or nationality), the making of inferences from one to the other, is logically unsound (§ 33). One can no more think correctly in terms of Aryan heads or a Semitic race, for instance, than of blond linguistic types, Catholic physiques, or inflecting social institutions.

At the same time, speech and culture tend to form something of a unit as opposed to race. It is possible for a population to substitute a wholly new language and type of civilization for the old ones, as the American negro has done, and yet to remain relatively unmodified racially, or at least to carry on its former physical type unchanged in a large proportion of its members. On the other hand, a change of speech without some change of culture seems impossible. Certainly wherever Greek, Latin, Spanish, English, Arabic, Pali, Chinese have penetrated, there have been established new phases of civilization. In a lower degree, the same principle probably holds true of every gain of one language at the expense of another, even when the spreading idiom is not associated with a great or active culture.

The linkage of speech and culture is further perceptible in the degree to which they both contribute, in most cases, to the idea of nationality. What chiefly marks off the French nation from the Italian, the Dutch from the German, the Swedish from the Norwegian—their respective customs and ideals, or the language gap? It would be difficult to say. The cultural differences tend to crystallize around language differences, and then in turn are reinforced by language, so that the two factors interact complexly. Nationality, especially in its modern developments, includes another factor, that of social or political segregation, which may in some degree run counter to both speech and culture. Switzerland with its German, French, and Italian speaking population, or Belgium, almost equally divided between Flemings and Walloons, are striking examples. Yet however successfully Switzerland and Belgium maintain their national unity, it is clear that this is a composite of subnational elements, each of which possesses a certain cultural as well as linguistic distinctness. Thus the Walloon speaks a French dialect, the Fleming a Dutch one; and the point of view, temperament, historic antecedents, and minor customs of the two groups are perceptibly different. Similarly, both the history and the outlook and therefore the culture of the French and German cantons of Switzerland are definitely distinguishable.

57. Relative Worth of Languages

One respect in which languages differ from cultures is that they cannot, like the latter, be rated as higher and lower. Of course, even as regards culture, such rating is often a dubious procedure, meaning little more than that the person making the comparison assumes his own culture to be the highest and estimates other cultures low in proportion as they vary. Although this is a subjective and uncritical procedure, nevertheless certain objective comparisons are possible. Some cultures surpass others in their quantitative content: they possess more different arts, abilities, and items of knowledge. Also, some culture traits may be considered intrinsically superior to others: metal tools against stone ones, for instance, since metal is adopted by all stone culture peoples who can secure it, whereas the reverse is not true. Further, in most cases a new addition does not wholly obliterate an older element, this retaining a subsidiary place, or perhaps serving some more special function than before. In this way the culture becomes more differentiated. The old art may even attain a higher degree of perfection than it had previously; as the finest polish was given to stone implements in northern Europe after bronze was known. In general, accretion is the process typical of culture growth. Older elements come to function in a more limited sphere as new ones are added, but are not extirpated by them. Oars and sails remain as constituent parts of the stock of civilization after it has added steam and motor boats. In the senses then that a culture has a larger content of elements, that these elements are more differentiated, and that a greater proportion of these elements are of the kind that inherently tend to supersede related elements, the culture may be considered superior.

As regards languages, there are also quantitative differences. Some contain several times as many words as others. But vocabulary is largely a cultural matter. A people that uses more materials, manufactures more objects, possesses knowledge of a larger array of facts, and makes finer discriminations in thought, must inevitably have more words. Yet even notable increases in size of speech content appear not to be accompanied by appreciable changes in form. A larger vocabulary does not mean a different type of structure. Grammar seems to be little influenced by culture status. No clear correspondence has yet been traceable between type or degree of civilization and type of language. Neither the presence nor the absence of particular features of tense, number, case, reduplication, or the like seems ever to have been of demonstrable advantage toward the attainment of higher culture. The speech of the former and modern nations most active in the propagation of culture has been of quite diverse type. The languages of the Egyptians (Hamitic); Sumerians; Babylonians and Arabs (Semitic); Hindus and Greeks (ancient Indo-European); Anglo-Saxons (modern Indo-European); Chinese; and Mayas, are about as different as exist. The Sumerian type of civilization was taken over bodily and successfully by the Semitic Babylonians. The bulk of Japanese culture is Chinese; yet Japanese speech is built on wholly different principles.

Then, it is impossible to rate one speech trait or type as inherently or objectively superior to another on any basis like that which justifies the placing of a metal culture above a stone culture. If wealth of grammatical apparatus is a criterion of superiority, Latin is a higher language than French, and Anglo-Saxon than English. But if lack of declensions and conjugations is a virtue, then Chinese surpasses English almost as much as English surpasses Latin. There is no reason favoring one of these possible judgments rather than its opposite. *Amabo* is no better or worse than *I shall love* as a means of expressing the same idea. The one is more compact, the other more plastic. There are times when compactness is a virtue, occasions when plasticity has advantages. By the Latin or synthetic standard, the English expression is loose jointed, lacking in structure; by the English or analytic standard, the Latin form is over-condensed, adhering unnecessarily to form. One cannot similarly balance the merits of a steel and a flint knife, of a medical and a shamanistic phase of society. The one cuts or cures better than the other.

So, from the point of view of civilization, language does not matter. Language will always keep up with whatever pace culture sets it. If a new object is invented or a new distinction of thought made, a word is coined or imported or modified in meaning to express the new concept. If a thousand or ten thousand new words are required, they are developed. When it desires to express abstractions like futurity or plurality, any language is capable of doing so, even if it does not habitually express them. If a language is unprovided with formal means for the purpose, such as a grammatical suffix, it falls back on content and uses a word or circumlocution. If the life of a people changes and comes to be conducted along lines that render it frequently important to express an idea like futurity to which previously little attention has been paid, the appropriate circumlocution soon becomes standardized, conveniently brief, and unambiguous. In general, every language is capable of indefinite modification and expansion and thereby is enabled to meet cultural demands almost at once. This is shown by the fact that virtually anything spoken or written can be translated into almost every other language without serious impairment of substance. The æsthetic charm of the original may be lost in the translation; the new forms coined in the receiving language are likely at first to seem awkward; but the meaning, the business of speech, gets expressed.

58. SIZE OF VOCABULARY

The tendency is so instinctive in us to presuppose and therefore to find qualities of inferiority, poverty, or incompleteness in the speech of populations of more backward culture than our own, that a widespread, though unfounded, belief has grown up that the languages of savages and barbarians are extremely limited quantitatively—in the range of their vocabulary. Similar misconceptions are current as to the number of words actually used by single individuals of civilized communities. It is true that no one, not even the most learned and prolific writer, uses all the words of the English language as they are found in an unabridged dictionary. All of us understand many words which we habitually encounter in reading and may even hear frequently spoken, but of which our utterance faculties for some reason have not made us master. In short, a language, being the property and product of a community, possesses more words than can ever be used by a single individual, the sum total of whose ideas is necessarily less than that of his group. Added to this are a certain mental sluggishness, which restricts most of us to a greater or less degree, and the force of habit. Having spoken a certain word a number of times, our brain becomes accustomed to it and we are likely to employ it to the exclusion of its synonyms or in place of words of related but distinguishable meaning.

The degree to which all this affects the speech of the normal man has, however, been greatly exaggerated. Because there are, all told, including technical terms, a hundred thousand or more words in our dictionaries, and because Shakespeare in his writings used 24,000 different words, Milton in his poems 17,000, and the English Bible contains 7,200, it has been concluded that the average man, whose range of thought and power of expression are so much less, must use an enormously smaller vocabulary. It has been stated that many a peasant goes through life without using more than 300 or 400 words, that the vocabulary of Italian grand opera is about 600, and that he is a person above the average who employs more than 3,000 to 4,000 words. If such were the case it would be natural that the uncivilized man, whose life is simpler, and whose knowledge more confined, should be content with an exceedingly small vocabulary.

But it is certain that the figures just cited are erroneous. If any one who considers himself an average person will take the trouble to make a list of his speaking vocabulary, he will quickly discover that he knows, and on occasion uses, the names of at least one to two thousand different things. That is, his vocabulary contains so many concrete nouns. To these must be added the abstract nouns, the verbs, adjectives, pronouns, and the other parts of speech, the short and familiar words that are indispensable to communication in any language. It may thus be safely estimated that it is an exceptionally ignorant and stupid person in a civilized country that has not at his command a vocabulary of several thousand words.

Test counts based on dictionaries show, for people of bookish tastes, a knowledge of about 30,000 to 35,000 words. Most of these would perhaps never be spoken by the individuals tested, would not be at their actual command, but it seems that at least 10,000 would be so controlled. The carefully counted vocabulary of a five and a half year old American boy comprised 1,528 understandingly used words, besides participles and other inflected forms. Two boys between two and three years used 642 and 677 different words.

It is therefore likely that statements as to the paucity of the speech of unlettered peoples are equally exaggerated. He who professes to declare on the strength of his observation that a native language consists of only a few hundred terms, displays chiefly his ignorance. He has either not taken the trouble to exhaust the vocabulary or has not known how to do so. It is true that the traveler or settler can usually converse with natives to the satisfaction of his own needs with two or three hundred words. Even the missionary can do a great deal with this stock, if it is properly chosen. But it does not follow that because a civilized person has not learned more of a language, that there is no more. On this point the testimony of the student is the evidence to be considered.

Dictionaries compiled by missionaries or philologists of languages previously unwritten run to surprising figures. Thus, the number of words recorded in Klamath, the speech of a culturally rude American Indian tribe, is 7,000; in Navaho, 11,000; in Zulu, 17,000; in Dakota, 19,000; in Maya, 20,000; in Nahuatl, 27,000. It may safely be said that every existing language, no matter how backward its speakers are in their general civilization, possesses a vocabulary of at least 5,000 words.

59. Quality of Speech Sounds

Another mistaken assumption that is frequently made is that the speech of non-literary peoples is harsh, its pronounciation more difficult than ours. This belief is purely subjective. When one has heard and uttered a language all his life, its sounds come to one's mouth with a minimum of effort; but unfamiliar vowels and consonants are formed awkwardly and inaccurately. No adult reared in an Anglo-Saxon community finds *th* difficult. Nor does a French or German child, whose speech habits are still plastic, find long difficulty in mastering the particular tongue control necessary to the production of the *th* sound. But the adult Frenchman or German, whose muscular habits have settled in other lines, tries and tries and falls back on *s* or *t*. A Spaniard, however, would agree with the Anglo-Saxon as to the ease and "naturalness" of *th*. Conversely, the "rough" *ch* flows spontaneously out of the mouth of a German or Scotchman, whereas English, French, and Italians have to struggle long to master it, and are tempted to substitute *k*. German *ö* and French *u* trouble us, our "short" *u* is equally resistant to Continental tongues.

Even a novel position can make a familiar sound strange and forbidding. Most Anglo-Saxons fail on the first try to say *ngis;* many give up and declare it beyond their capacity to learn. Yet it is only *sing* pronounced backward. English uses *ng* finally and medially in words, not initially. Any English speaker can quickly acquire its use in the new position if, to keep from being disconcerted, he follows some such sequence as *sing, singing, stinging, ringing, inging, nging, ngis.*

So with surd *l*—Welsh *ll*—which is ordinary *l* minus the accompaniment of vocal cord vibrations. A little practice makes possible the throwing on or off of these vibrations, the "voicing" of speech, for any sound, with as much ease as one would turn a faucet on or off. Surd *l* thereupon flows with the same readiness as sonant *l*. As a matter of fact we often pronounce it unconsciously at the end of words like *little*. When it comes at the beginning, however, as in the tribal name usually written *Tlingit,* Americans tend to substitute something more habitual, such as *kl,* which is familiar from *clip, clean, clear, close, clam,* and many other words. The simple surd *l* has even been repeatedly described quite inappropriately as a "click"; which is about as far from picturing it with correctness as calling it a thump or a sigh; all because it comes in an unaccustomed position.

Combinations of sounds, especially of consonants, are indeed of variable difficulty for anatomical reasons. Some, like *nd* and *ts* and *pf*, have their components telescope or join naturally through being formed in the same part of the mouth. Others, like *kw* (*qu*), have the two elements articulated widely apart, but for that reason the elements can easily be formed simultaneously. Still others, like *kt* and *ths*, are intrinsically difficult, because the elements differ in place of production but are alike in method, and therefore come under the operation of the generic rule that similar sounds require more effort to join and yet discriminate than dissimilar ones; for much the same reason that it is on the whole easier to acquire the pronounciation of a wholly new type of sound than of one which differs subtly from one already known. Yet in these matters too, habit rather than anatomical functioning determines the reaction. German *pf* comes hard to adult Anglo-Saxons, English *kw* and *ths* to Germans. So far as degree of accumulation of consonants is concerned, English is one of the extremest of all languages. Monosyllables like *tract, stripped* (*stripd*), *sixths* (*siksths*), must seem irremediably hard to most speakers of other idioms.

Children's speech in all languages shows that certain sounds are, as a rule, learned earlier than others, and are therefore presumably somewhat easier physiologically. Sounds like *p* and *t* which are formed with the mobile lips and front of the tongue normally precede back tongue sounds like *k*. *B, d, g,* which are voiced like vowels, tend to precede voiceless *p, t, k*. Stops or momentary sounds, such as *b, d, g, p, t, k,* generally come earlier than the fricative continuants *f, v, th, s, z,* which require a delicate adjustment of lip or tongue—close proximity without firm contact—whereas the stops involve only a making and breaking of jerky contact. But so slight are the differences of effort or skill in all these cases, that as a rule only a few months separate the learning of the easier from that of the more difficult sounds; and adults no longer feel the differences. The only sound or class of sounds seriously harder than others seems to be that denoted by the letter *r*. Not only do children usually acquire *r* late, but among all races there appears to be a certain percentage of individuals who never learn to form the sound right, but substitute one approaching *g* or *w* or *j* or *l*. The reason is that *r* stands alone among speech sounds. It is the only one produced by blowing the tongue into a few gross vibrations; which means that this organ must be held in a special condition of laxness and yet elevated so that the flow of breath may bear on it. However, even this inherent difficulty has been insufficient to prevent many languages from changing easier sounds into *r*.

60. Diffusion and Parallelism in Language and Culture

A phenomenon which language shows more conspicuously than culture, or which is more readily demonstrated in it, is parallel or convergent development, the repeated, independent growth of a trait (§ 89, 100).

Thus sex gender is an old part of Indo-European structure. In English, by the way, it has wholly disappeared, so far as formal expression goes, from noun, adjective, and demonstrative and interrogative pronoun. It lingers only in the personal pronoun of the third person singular—*he, she, it.* A grammar of living English that was genuinely practical and unbound by tradition would never mention gender except in discussing these three little words. That our grammars specify *man* as a masculine and *woman* as a feminine noun is due merely to the fact that in Latin the corresponding words *vir* and *femina* possess endings which are recognized as generally masculine and feminine, and that an associated adjective ends respectively in masculine *-us* or feminine *-a.* These are distinctions of form of which English possesses no equivalents. The survival of distinction between *he, she,* and *it,* while *this* and *the* and *which* have become alike irrespective of the sex of the person or thing they denote, is therefore historically significant. It points back to the past and to surviving Indo-European languages.

Besides, Indo-European, Semitic and Hamitic express sex by grammatical forms, although like French and Spanish and Italian, they know only two genders, the neuter being unrepresented. These three are the only large language stocks in which sex gender finds expression. Ural-Altaic, Chinese, Japanese, Dravidian, Malayo-Polynesian, Bantu, and in general the language families of Asia, Africa, and America do without, although a number of languages make other gender classifications, as of animate and inanimate, personal and impersonal, superior and inferior, intelligent and unintelligent. Sex gender however reappears in Hottentot of South Africa, and in the Chinook and Coast Salish and Pomo languages of the Pacific coast of North America.

How is this distribution to be accounted for? Indo-European, Semitic, and Hamitic occupy contiguous territory, in fact surround the Mediterranean over a tract approximately co-extensive with the Caucasian area. Could they in the remote past have influenced one another? That is, could grammatical sex gender have been invented, so to speak, by one of them, and borrowed by the others, as we know that cultural inventions are constantly diffused? Few philologists would grant this as likely: there are too few authenticated cases of formal elements or concepts having been disseminated between unrelated languages. Is it then possible that our three stocks are at bottom related? Sex gender in that case would be part of their common inheritance. For Semitic and Hamitic a number of specialists have accepted a common origin on other grounds. But for Semitic and Indo-European, philologists, who are professionally exacting, are in the main quite dubious. Positive evidence seems yet to be lacking. Still, the territorial continuity of the three speech groups showing the trait is difficult to accept as mere coincidence. In a parallel case in the realm of culture history, a common source would be accepted as highly probable. Even Hottentot has been considered a remote Semitic-Hamitic offshoot, largely, it is true, because of the very fact that it expresses gender. Philologists, accordingly, may consider the case still open; but it is at least conceivable that the phenomenon goes back to a single origin in these four Old World stocks.

Yet no stretch will account for sex gender in the three American languages as due to contact influence or diffusion, nor relate these tongues to the Old World ones. Clearly here is a case of independent origin or parallel ''invention.'' Chinook and Coast Salish, indeed, are in contiguity, and one may therefore have taken up the trait in imitation of the other. But Pomo lies well to the south and its affiliations run still farther south. Here sex gender is obviously an independent, secondary, and rather recent growth in the grammar.

In short, it remains doubtful whether sex gender originated three or four or five or six times among these seven language stocks; but it evidently originated repeatedly.

Other traits crop out the world over in much the same manner. A dual, for instance, is found in Indo-European, Malayo-Polynesian, Eskimo, and a number of other American languages. The distinction between inclusive and exclusive *we—you and I* as opposed to *he and I*—is made in Malayo-Polynesian, Hottentot, Iroquois, Uto-Aztecan.

A true nominative case-ending, such as Latin and the other varieties of Indo-European evince, is an exceedingly specialized formation; yet is found in the Maidu language of California. Articles, in regard to which Indo-European varies, Latin for instance being without, while its Romance daughter tongues have developed them, recur in Semitic, in Polynesian, and in several groups of American languages, such as Siouan and Hokan. The growth in Romance is significant because of its historicity, and because it was surely not due to imitation of an unrelated language. That is, French developed its articles independently and secondarily; a fact that makes it probable that many languages in other parts of the world, whose history we do not know, developed theirs in a parallel manner, as a product of wholly internal causes—"invented" them, in short, although wholly unconsciously.

A trait found in a large proportion of the American languages is the so-called incorporation of the object pronoun (§ 51). The objective pronoun, or an element representing it, is prefixed or suffixed to the verb, made a part of it. The process is familiar enough to us from Indo-European so far as the subject is concerned: in Latin *ama-s, ama-t, ama-nt,* the suffixes express "you, he, they" and pronouns comparable to the English ones—independent words—are usually omitted. The *-s* in *he love-s* is the sole survival of the process in modern English. None of the older Indo-European tongues however showed an inclination to affix similar elements for the objects, although there are some approaches in a few recent languages of the family: Spanish *diga-me,* "tell me," and "*mata-le,* "kill him," for instance. Semitic on the other hand, and Basque, do "incorporate" objective elements, whereas most Asiatic and some American languages do not. Many other instances of parallel or convergent traits could be cited.

This greater frequency of parallel developments in language than in culture is perhaps in part due to easier demonstrability in the field of speech. But in the main the higher frequency seems real. Two reasons for the difference suggest themselves.

First, the number of possibilities is small in language, so far as structure is concerned. The categories or concepts used for classifying and for the indication of relations are rigorously limited, and so are the means of expression. The distinctions expressed by gender, for instance, may refer to sex, animateness, personality, worth, shape, position, or possibly one or two other qualities; but there they end. If a language recognizes gender at all, it must have gender of one of these few types. Consequently there is some probability of several unconnected languages sooner or later happening upon the same type of gender. Similarly, for the kinds of number, and of case, and so on, that are denotable. These larger categories, like gender and number and case, are not numerous. Then, the means of expressing such relational and classificatory concepts are limited. There is position or relative order of words; compounding of them; accretions of elements to stems, namely prefixes, infixes, and suffixes; reduplication, the repetition of part or the whole of words; internal changes by shift of vowel or accent within words; and therewith the types of grammatical means are about exhausted. The number of possible choices is so small that the law of accidental probability must cause many languages to hit upon the same devices.

A second reason for the greater frequency of parallelism in language is that structural traits appear to resist diffusion by imitation to a considerable degree. Words are borrowed, sometimes freely, almost always to some degree, between contiguous languages; sounds considerably less; grammar least of all. That is, linguistic content lends itself to diffusion readily, linguistic form with difficulty.

At bottom, the same holds of culture. Specific elements of culture or groups of such elements diffuse very widely at times and may be said to be always tending to diffuse: the wheel, for instance, smelting of metals, the crown as a symbol of royalty, the swastika, Buddhism. The relations of elements among themselves, on the other hand, change by internal growth rather than external imitation. Of this sort are the relations of the classes and members of societies, the fervor with which religion is felt, the esteem accorded to learning or wealth or tradition, the inclination toward this or that avenue of subsistence or economic development. By conquest or peaceful pressure or penetration one people may shatter the political structure or social fabric of another, may undermine its conservatism, may swerve its economic habits. But it is difficult to find cases of one people adopting such tendencies or schemes of cultural organization in mere imitation of the example of another, as it will adopt specific culture content—the wheel or crown or Buddhism, for instance—from outside, often readily. The result is that culture relations or forms develop spontaneously or from within rather than as a result of direct taking over. Also, the types of culture forms being limited in number, the same type is frequently evolved independently. Thus monarchical and democratic societies, feudal or caste-divided ones, priest-ridden and relatively irreligious ones, expansive and mercantile or self-sufficient and agricultural nations, evolve over and over again. On the whole, comparative culture history more often deals with the specific contents of civilization, perhaps because events like the spread of an invention can be traced more definitely and exactly than the rather complex evolutions of say two feudal systems can be compared. The result is that diffusions seem to outweigh parallels; as is set forth in several of the chapters that follow this one (§ 105, 111, 127).

In comparative linguistics, on the other hand, interest inclines to the side of form rather than content; hence the parallelisms or convergences are conspicuous. If as much attention were generally given to words as to grammar, and if they could be traced in their prehistoric or unrecorded wanderings as reliably as many culture traits have been, it is probable that diffusion would loom larger as a principle shaping human speech. There are words that have traveled almost as far as the objects they denote: *tobacco* and *maize,* for example. And the absorption of words of Latin origin into English was as extensive as the absorption for over a thousand years of Latin, Christian, and Mediterranean culture by the English people—went on as its accompaniment and result.

61. CONVERGENT LANGUAGES

Parallel development in speech form is not restricted to traits like sex gender and object incorporation. It may affect whole languages. Chinese a long time ago became an extremely analytical or "isolating" language. That is, it lost all affixes and internal change. Each word became an unalterable unit. Sentences are built up by putting together these atoms. Grammatical relations are expressed by the order of words: the subject precedes the predicate, for instance. Other ideas that in many languages are treated formally, such as the plural or person, are expressed by content elements, that is, by other words: *many* for the plural, separate pronouns instead of affixes for person, and so on. The uniformly monosyllabic words of Chinese accentuate this isolating character, which however does not depend intrinsically upon the monosyllabism. In the Indo-European family, as already mentioned, there has been a drift in the same direction during the last two thousand years. This drift toward loss of formal mechanisms and toward the expression of grammar by material elements or their position only, has been evident in all branches of Indo-European, but has been most marked in English. The chief remnants of the older inflectional processes in spoken English of to-day are four verb endings, *-s, -ed, -ing, -en;* three noun endings, the possessive *-'s* and the plurals *-s* and *-en,* the latter rare; the case ending *-m* in *whom, them;* a few vowel changes for plurals, as in *man—men,* and *goose—geese;* and perhaps two hundred vowel changes in verbs, like *sing, sang, sung.* Compared with Latin, Sanskrit, or even primitive Germanic, this brief list represents a survival of possibly a tenth of the original synthetic inflectional apparatus. That is, English has gone approximately nine tenths of the way towards attaining a grammar of the Chinese type. A third language of independent origin, Polynesian, has traveled about the same distance in the same direction. Superficially it is less like Chinese in that it remains prevailingly polysyllabic, but more like it in having undergone heavy phonetic attrition. This then is a clear case of entire languages converging toward a similar type.

Another instance is found in the remarkable resemblances in plan of structure of Indo-European, especially in its older forms, and of the Penutian group of languages in native California. Common to these two families are an apparatus of similar cases, including accusative, genitive, locative, ablative, instrumental; plural by suffix; vowel changes in the verb according to tense and mode; a passive and several participles and modal forms expressed by suffixes; pronouns either separate or expressed by endings fused with the tense-modal suffixes. Thus, the processes which make English *sing, sang, sung, song,* or *bind, bound, band, bond,* are substantially identical with those which have produced in Penutian Yokuts such forms as *shokud,* pierce, *shukid-ji,* pierced, *shokod,* perforation or hole, *shikid,* piercer or arrow. In short, most of the traits generally cited as constituting the Indo-European languages typically inflectional, reappear in Penutian, and of course independently as regards their origin and history.

These would appear to be phenomena comparable to the growth of feudalism in China more than a thousand years earlier than in Europe, or the appearance of a great centrally governed empire in Peru similar to the ancient monarchies of the Orient.

62. Unconscious Factors in Language and Culture

The unceasing processes of change in language are mainly unconscious. The results of the change may rise to the recognition of the speakers; the act of change, and especially its causes, happen without awareness of those through whose minds and mouths they take place. This holds of all departments of language: the phonetics, the structural form, largely even the meaning of words. When a change has begun to creep in, it may be observed and be consciously resisted on the ground of being incorrect or vulgar or foreign. But the underlying motives of the objectors are apparently as unknown to themselves as the impulses of the innovators.

If this view seem extreme, it can easily be shown that the great bulk of any language as it is, apart from any question of change, is employed unconsciously. An illiterate person will use such forms as *child, child's, children, children's* with the same ''correctness'' as a philologist, yet without being able to give an explanation of the grammatical ideas of singularity and plurality, absoluteness and possession, or to lay down rules as to the manner of expression of these ideas in English. Grammar, in short, exists before grammarians, whose legitimate business is to uncover such rules as are already there. It is an obviously hasty thought that because grammar happens to be taught in schools, speech can be grammatical only through such formal teaching. The Sanskrit and Greek and Latin languages had their declensions and conjugations before Hindu and Greek and Roman scholars first analyzed and described them. The languages of primitive peoples frequently abound with complicated forms and mechanisms which are used consistently and applied without suspicion of their existence. It is much as the blood went round in our bodies quite healthily before Harvey's discovery of its circulation.

The quality of unconsciousness seems not to be a trait specifically limited to linguistic causes and processes, but to hold in principle of culture generally. It is only that the unconsciousness pervades speech farther. A custom, a belief, an art, however deep down its springs, sooner or later rises into social consciousness. It then seems deliberate, planned, willed, and is construed as arising from conscious motives and developing through conscious channels. But many social phenomena can be led back only to non-rational and obscure motives: the wearing of silk hats, for instance. The whole class of changes in dress styles spring from unconscious causes. Sleeves and skirts lengthen or shorten, trousers flare or tighten, and who can say why? It is perhaps possible to trace a new fashion to Paris or London, and to a particular stratum of society there. But what is it that in the winter of a particular year makes every woman—or man—of a certain social group wear, let us say, a high collared coat, or a shoe that does not come above the ankle, and the next year, or the tenth after, the reverse? It is insufficient to say that this is imitation of a leader of fashion, of a professional creator of style. Why does the group follow him and think the innovation attractive and correct? A year earlier the same innovation would have appeared senseless or extravagant to the same group. A year after, it appeals as belated and ridiculous, and every one wonders that style was so tasteless so short a time ago.

Evidently the æsthetic emotions evoked by fashions are largely beyond the control of both individuals and groups. It is difficult to say where the creative and imitative impulses of fashion come from; which, inasmuch as the impulses obviously reside somewhere in human minds, means that they spring from the unconscious portions of the mind. Evidently then our justification of the dress styles we happen at any time to be following, our pronouncing them artistic or comfortable or sensible or what not, is secondary. A low shoe may be more convenient than a high one, a brown one more practical than a black one. That that is not the reason which determines the wearing of low brown shoes when they are customarily worn, is shown by the fact that at other times high black ones are put on by every one. The reasons that can be and are given are so changeable and inconsistent that they evidently are not the real reasons, but the false secondary reasons that are best distinguished as rationalizations. Excuses, we should call them with reference to individual conduct.

What applies to fashion holds also of manners, of morals, and of many religious observances. Why we defer to women by rising in their presence and passing through a door behind them; why we refrain from eating fish with a knife or drinking soup out of a two handled cup, though drinking it from a single handled one is legitimate; why we do not marry close kin; why we remove our hats in the presence of the deity or his emblems but would feel it impious to pull off our shoes; all the thousands of prescriptions and taboos of which these are examples, possess an unconscious motivation.

Such cases are also illustrations of what is known as the relativity of morals. The Jew sets his hat on to worship, the Oriental punctiliously slips out of his shoes. Some people forbid the marriage of the most remote relatives, others encourage that of first cousins, still others permit the union of uncle and niece. It would seem that all social phenomena which can be brought under this principle of relativity of standard are unconsciously grounded. This in turn implies the unconscious causation of the mores, those products of the social environment in which one is reared and which one accepts as the ultimate authority of conduct. As mores are those folkways or customs to which an emotional coloring has become attached, so that adherence to the custom or departure from it arouses a feeling respectively of approval or disapproval, it is evident that the origin of folkways generally is also unconscious, since there seems no reason why the emotions or ethical affect enveloping a customary action should incline more than the custom itself to spring up unconsciously.

It has become recognized that the average man's convictions on social matters remote from him are not developed through examination of evidence and exercise of reason, but are taken over, by means of what is sometimes denominated the ‘‘herd instinct,’’ from the society or period in which he happens to have been born and nurtured. His belief in democracy, in monotheism, in his right to charge profit and his freedom to change residence or occupation, have such origin. In many instances it is easy to render striking proof of the proposition: as in the problems of high tariff, or the Athanasian creed, or compulsory vaccination, which are so technical or intricate as to be impossible of independent solution by evidence and argument by the majority of men. Time alone would forbid: we should starve while making the necessary research. And the difference between the average man's attitude on such difficult points and the highly gifted individual's attitude toward them or even toward simpler problems, would seem to be one of degree only.

Even on the material sides of culture, unconscious motivation plays a part. In the propulsion of ships, oars and sails fluctuated as the prevalent means down almost to the period of steam vessels. It would be impossible to say that one method was logically superior to the other, that it was recognized as such and then rationally adhered to. The history of warfare shows similar changes between throwing and thrusting spears, stabbing and hewing swords, light and heavy armor. The

Greeks and Macedonians in the days of their military superiority lengthened their lances and held them. It no doubt seemed for a time that a definite superiority had been proved for this type of weapon over the shorter, hurled javelin. Then the Romans, as part of their legionary tactics, reverted to the javelin and broke the Macedonian phalanx with their pilum. But the Middle Ages again fell back on the thrusting lance. The Greeks successfully developed heavy armor, until Athenian light armed troops overcame Spartan hoplites. The Macedonians reintroduced heavy armament, which held sway in Europe until after the prevalence of firearms. But the last few years have brought the rebirth of the helmet.

These fashions in tools and practical appliances do not alter as fast as modern dress styles, and part of their causes can often be recognized. Yet there seems no essential difference, as regards consciousness, between the fluctuation of fashions in weapons—or navigation or cooking or travel or house building—and, let us say, the fluctuation of mode between soft and stiff hats or high and low shoes. It may be admitted to have been the open array of the legion that led to the pilum; the bullet that induced the abandonment of the breast plate, shrapnel that caused the reintroduction of the helmet. But these initiating factors were not deliberate as regards the effects that came in their train; and in their turn they were the effects of more remote causes. The whole chain of development in such cases is devious, unforeseen, mainly unforeseeable. At most there is recognition of what is happening; in general the recognition seems to become full only after the change in tool or weapon or industrial process has become completed and is perhaps already being undermined once more.

Of course purely stylistic alterations—and linguistic innovations—also possess their causes. When the derby hat or the pronoun *thou* becomes obsolete, there is a reason, whether or not we know it or do not see it clearly.

The common causal element in all these changes may be called a shift in social values. Perhaps practical chemical experience has grown, and gunpowder explodes more satisfactorily; or an economic readjustment has made it possible to equip more soldiers with guns. The first result is a greater frequency of bullet penetrations in battle; the next, the abandonment of the breast plate. Increasing wealth or schooling or city residence makes indiscriminate familiarity of manners seem less desirable than at an earlier period: brusque *thou* begins to yield to indirect plural *you*. Or again, new verbs, all of regular conjugation like *love, loved,* are formed in English or imported from French until their number outweighs that of the ancient irregular ones like *sing, sang*. A standardizing tendency is thereby set going—"analogizing" is the technical term of the philologist—which begins to turn irregular verbs into regular ones: *dived* replaces *dove,* just as *lenger* becomes *longer,* and *toon* becomes *toes*. There is the same sort of causality in one of these phenomena as in another. The individual or community that leaves off the breast plate or stiff hat is more likely to be aware that it is performing the act than the one that leaves off saying *toon* or *thou*. But it does not seem that there is an essential difference of process. Linguistic and æsthetic changes are most fully unconscious, social ones next, material and economic ones perhaps least. But in all cases change or innovation is due to a shift of values that are broader than the single phenomenon in question, and that are held to impulsively instead of reasonably. That is why all social creations—institutions, beliefs, codes, styles, speech forms—prove on impartial analysis to be full of inconsistencies and irrationalities. They have sprung not from weighed or reasoned choices but from impulsive desires and emotionally colored habits.

The foregoing discussion may be summarized as follows. Linguistic phenomena and processes are on the whole more deeply unconscious than cultural ones, without however differing in principle. In both language and culture, content is more readily imparted and assimilated than form and enters farther into consciousness. Organization or structure in both cases takes place according to unconscious patterns, such as grammatical categories, social standards, political or economic points of view, religious or intellectual assumptions. These patterns attain recognition only in a late stage of sophistication, and even then continue to alter and to be influential without conscious control. The number of such linguistic and social patterns being limited, they tend to be approximately repeated without historic connection. Partially similar combinations of such patterns sometimes recur, producing languages or cultures of similar type. But established patterns, and still more their combinations, replace each other with difficulty. Their spread therefore takes place through the integral substitution of one language or culture for another, rather than by piecemeal absorption. This is in contrast to the specific elements of which language and culture consist—individual words, mechanical devices, institutional symbols, particular religious ideas or actions, and the like. These elements absorb and diffuse readily. They are therefore imitated more often than they are reinvented. But linguistic and cultural patterns or structures growing up spontaneously may possess more general resemblance than historic connection.

63. Linguistic and Cultural Standards

It does not follow that because social usages lack a rational basis, they are therefore unworthy of being followed, or that standards of conduct need be renounced because they are relative, that is, unconsciously founded and changing. The natural inclination of men being to regard their standards of taste, behavior, and social arrangement as wholly reasonable, perfect, and fixed, there follows a first inclination to regard these standards as valueless as soon as their emotionality and variability have been recognized. But such a tendency is only a negative reaction against the previous illusion when this has disappointed by crumbling. The reaction is therefore in a sense a further result of the illusion. Once the fundamental and automatic assumption of fixity and inherent value of social patterns has been given up, and it is recognized that the motive power of behavior in man as in the other animals is affective and unconscious, there is nothing in institutions and codes to quarrel with. They are neither despicable nor glorious; no more deserving in virtue of their existence to be uprooted and demolished than to be defended as absolute and eternal. In some form or other, they are inevitable; and the particular form which they take

omit

at this time or that place is always tolerably well founded, in the sense of being adapted with fair success, or having been but recently well adapted, to the conditions of natural and social environment of the group which holds the institution, code, or standard.

That this is a sane attitude is more easily shown in the field of language than of culture, because, language being primarily a mechanism or means, whereas in culture ends or purposes tend more to obtrude, it is easier to view linguistic phenomena dispassionately. Grammars and dictionaries, for instance, are evidently the result of self-consciousness arising about speech which has previously been mainly unconscious. They may be roughly compared to social formulations like law codes or written constitutions or philosophic systems or religious dogmas, which are also representations of usages or beliefs already in existence. When grammarians stigmatize expressions like *ain't* or *them cows* or *he don't* as "wrong," they are judging an innovation, or one of several established conflicting usages, by a standard of correctness that seems to them absolute and permanent. As a matter of actuality, the condemned form may or may not succeed in becoming established. *He don't,* for example, might attain to correctness in time, although *ain't* is perhaps less likely to become legitimized, and *them cows* to have still smaller prospect of recognition. That a form departs from the canon of to-day of course no more proves that it will be accepted in future than that it will not. What is certain is that if it wins sufficient usage, it will also win sanction, and will become part of the standard of its time.

Linguistic instances like these differ little if at all in principle, in their involved psychology, from the finding of the Supreme Court that a certain legislative enactment is unconstitutional and therefore void; or from the decision of a denomination that dancing or playing golf on Sunday is wicked; or from the widespread sentiment that breaking an unpopular law like that on liquor prohibition is morally justifiable. The chief point of divergence would seem to be that a court is a constituted body endowed with an authority which is not paralleled on the linguistic side, at any rate in Anglo-Saxon countries; although the Latin nations possess Academies whose dicta on correctness of speech enjoy a moral authority approximating the verdicts of a high court.

It is also of interest to remember that the power of nullifying legislation was not specifically granted the Supreme Court by the Constitution of the United States, but that the practice grew up gradually, quite like a speech innovation which becomes established. Certain elements in the American population look upon this power as undesirable and therefore take satisfaction in pointing out its unsanctioned origin. The majority on the other hand feel that the situation on the whole works out well, and that a Supreme Court with its present powers is better than the risk of a Court without power. Still, it remains curiously illogical that the preservation of the Constitution should take place partly through the extra-constitutional functioning of a constitutional body. In principle such a case is similar to that of grammarians who at the same time lay down a rule and exceptions to the rule, because the contradictory usages happen to be actually established.

Codes, dogmas, and grammars are thus normally reflections rather than causes. Such influence as they have is mainly in outward crystallization. They produce a superficial appearance of permanence. In the field of speech, it is easy to recognize that it is not grammarians that make languages, but languages that make grammarians. The analogous process evidently holds for culture. Lawgivers, statesmen, religious leaders, discoverers, inventors, therefore only seem to shape civilization. The deep-seated, blind, and intricate forces that shape culture, also mold the so-called creative leaders of society as essentially as they mold the mass of humanity. Progress, so far as it can objectively be considered to be such, is something that makes itself. We do not make it. Our customary conviction to the contrary is probably the result of an unconscious desire not to realize our individual impotence as regards the culture we live in. Social influence of a sort we do have as individuals. But it is a personal influence on the fortune and careers of other individual members of society, and is concerned largely with aims of personal security, relative dominance, or affection among ourselves. This obviously is a different thing from the exertion of influence on the form or content of civilization as such.

64. Rapidity of Linguistic Change

The rate of change in language is circumscribed by the principles of linguistic causality that have been discussed, but it remains an obscure subject in detail. The opinion often held that unwritten languages necessarily alter faster than written ones, or that those of savages are less stable than the tongues of civilized men, is mainly a naïve reflection of our sense of superiority. It contravenes the principles just referred to and is not supported by evidence. Occasional stories that a primitive tribe after a generation or two was found speaking an almost made-over language are unconscious fabrications due to preconception and supported by hasty acquaintance, faulty records, misunderstanding, or perhaps change of inhabitants. Nahuatl, the language of the Aztecs, has probably changed less in four hundred years than Spanish; Quechua, that of the Incas, no more. English has apparently altered more than any of the three in the same period. Dozens of native tongues, some of them from wholly rude peoples, were written down in the sixteenth and seventeenth centuries by Spanish and other priests, and in most instances the grammars and dictionaries prove to be usable to-day.

Cultural alteration would appear to work toward speech change chiefly in certain ways. New things need new names; new acts mean new thoughts and new ideas require new words. These may be imported; or they may be made out of elements already in the language; or old words may undergo a shift of meaning. In any event, the change is mainly on the side of vocabulary. The sounds of a language are generally much less affected; its plan of structure least of all. The introduction of a new religion or development of a new form of government among a people need not be accompanied by changes in the grammar of their speech, and usually are not, as abundant historical examples prove.

While the causes of grammatical innovation are far from clear, contact with alien tongues is certainly a factor in some degree. An isolated off-shoot of a linguistic group is generally more specialized, and therefore presumably more altered, than the main body of dialects of the family. The reason is that the latter, maintaining abundant reciprocal contact, tend to steady one another, or if they swerve, to do so in the same direction. The speakers of the branch that is geographically detached, however, come to know quite different grammars so far as they learn languages other than their native one, and such knowledge seems to act as an unconscious stimulus toward the growth of new forms and uses. It is not that grammatical concepts are often imitated outright or grammatical elements borrowed. Acquaintance with a language of different type seems rather to act as a ferment which sets new processes going.

It is in the nature of the case that direct specific evidence of changes of this character is hard to secure. But comparison of related languages or dialects with reference to their location frequently shows that the dialects which are geographically situated among strange languages are the most differentiated. This holds of Abyssinian in the Semitic family, of Brahui in Dravidian, of Singhalese in the Indic branch of Indo-European, of Hopi and Tübatulabal in Shoshonean, of Arapaho and Blackfoot in Algonkin, of Huastec in Mayan.

But it is also likely that languages differ among each other in their susceptibility to change, and that the same language differs in successive periods of its history. It is rather to be anticipated that a language may be in a phase now of rapid and then of retarded metabolism, so to speak; that at one stage its tendency may be toward breaking down and absorption, at another toward a more rigid setting of its forms. Similarly, there is reason to believe that languages of certain types of structure are inherently more plastic than others. At any rate, actual differences in rate of change are known. The Indo-European languages, for instance, have perhaps without exception altered more in the three thousand years of historic record than the Semitic ones. And so in native America, while contemporary documentary record is of course wanting, the degree of differentiation within the two stocks suggests strongly that Athabascan is more tenaciously conservative than Siouan.

There are also notable differences in the readiness to borrow words ready-made. English is distinctly more hospitable in this regard than German, which tends rather to express a new concept by a new formation of old elements. The South American languages appear to have borrowed more words from one another than those of North America. In this matter the type of language is probably of some influence, yet on the whole cultural factors perhaps predominate. The direction and degree of cultural absorption seem to determine the absorption of words to a considerable measure. Here writing is certainly potent. The Latin and French element in English, the Sanskrit and Arabic element in the Malaysian languages, were brought in to a large extent by writing, and would evidently have remained much smaller if the historic contacts had been wholly oral. This is perhaps the most important way in which writing exerts influence on the development of spoken language; an influence which in other respects is usually overestimated.

CHAPTER VI

THE BEGINNINGS OF HUMAN CIVILIZATION

65. Fossils of the body and of the mind.—66. Stone and metals.—67. The Old and the New Stone Ages.–68. The Eolithic Age.—69. The Palæolithic Age: duration, climate, animals.—70. Subdivisions of the Palæolithic.—71. Human racial types in the Palæolithic.—72. Palæolithic flint implements.—73. Other materials: bone and horn.—74. Dress.—75. Harpoons and weapons.—76. Wooden implements.—77. Fire.—78. Houses. —79. Religion.—80. Palæolithic art.—81. Summary of advance in the Palæolithic.

65. Fossils of the Body and of the Mind

The discovery of fossils has yielded some idea of the history of the human body during the past million years. The evidence is far from complete, but there is enough to prove a development much as might be expected under the hypothesis of evolution. To some extent fossils also afford an insight into the development of the human mind. The capacity of a skull gives the size of the brain. The interior surface of the skull corresponds to the outer surface of the brain. In this way some slight knowledge has been gained of the development in ancient types of man of the convolutions and centers of the brain surface with which mental activity is associated. Even limb bones yield indirect indications. A straight thigh means an erect posture of the body, with the arms no longer used for locomotion. Released from this service, they are freed for other purposes, such as grasping, handling, and various forms of what we call work. But a hand adapted for work would be useless without an intelligence to direct its operations. Thus the bones of our precursors provide suggestions as to the degree of development of their minds. The suggestions are sketchy and incomplete, but they are worth something.

A second line of evidence is fuller. When a human or prehuman hand has made any article, one can judge from that article what its purpose is likely to have been, how it was used.

how much intelligence that use involved, what degree of skill was necessary to manufacture the article. All such artifacts—tools, weapons, or anything constructed—are a reflection of the degree of "culture" or civilization, elementary or advanced, possessed by the beings who made them.

On the whole the evidence to be got from artifacts as to the degree of advancement of their makers or users is greater than the information derivable from the structure of skeletons. A large brain does not always imply high intelligence. Even a much convoluted brain surface may accompany a mediocre mind. In other words, the correlation between body and mind has not been worked out with accuracy. On the other hand an advanced type of tool necessarily implies more skill in its use, and therefore a decided development of the use of intelligence. Similarly, if one finds nothing but simple tools occurring among any past or present people, we may be sure that their civilization and the training of their minds have remained backward.

It is true that one cannot always infer from a particular manufactured object the mentality of the particular person who owned and used it. An imbecile may come into possession of a good knife and even possess some ability in using it. But he can acquire the knife only if there are other individuals in his community or time who know how to smelt iron and forge steel. In short, even a single jackknife is proof that human ingenuity has progressed to the point of making important discoveries, and that arts of relatively high order are being practised. In this way a solitary implement, if its discovery is thoroughly authenticated, may suffice to establish a relatively high or low degree of civilization for a prehistoric period or a vanished race.

An implement manufactured by human hands of the past is of course different from an actual fossil of a former human being, and it is always necessary to distinguish between the two. The one is something made by a human being and in some measure reflecting the development of his intelligence; the other something left over or preserved from the human body itself. Nevertheless, in a metaphorical sense, the implements of the past may well be spoken of as the fossils of civilization. They are only its fragments, but they allow us to reconstruct the mode of life of prehistoric peoples and utterly forgotten nations, in much the same way as the geologist and the palæontologist reconstruct from true fossils the forms of life that existed on the earth or in the seas millions of years ago.

There is even a further parallel. Just as the geologist knows that one fossil is older or younger than another from its position in the earth's crust or the stratum in which it was laid down, so the student of the beginnings of human civilization knows that the deposit at the bottom of a cave must be more ancient than the refuse at the top. He calls in the geologist to tell him the age of a glacial deposit or of a river terrace, and thus he may learn that, of two types of implements found at different places or levels, one is so many thousands of years or geological periods older than the other. In the long run, too, the older implements prove to be the simpler. Thus archæologists have succeeded in working out an evolution of civilization which parallels rather neatly the evolution of life forms. This evolution of human mental operations as it is reflected in the artifacts preserved from the lowest and earliest strata of civilization is the subject of the present chapter.

There is another way in which the evidence on the two lines of evolution is similar: its incompleteness. The geological record has been compared to a book from which whole chapters are missing; of others, but stray leaves remain; and only now and then have consecutive pages been preserved unmutilated. Humanity has always been so much less populous than the remainder of the animal kingdom, especially in its earlier stages, that the number of individuals whose bones have been preserved as fossils is infinitely smaller. The result is that we account ourselves fortunate in having been able to assemble six or seven not quite complete skeletons, and fragmentary portions of two or three dozen other individuals, of the Neandertal race which inhabited western Europe for thousands of years. For still earlier races or species of man the actual data are even scantier. Knowledge of so fundamental a form as Pithecanthropus, the earliest of the antecedents of man yet known, rests on two bones and two teeth, plus a third tooth discovered as the sole result of a subsequent expedition. Heidelberg man has to be reconstructed from a jaw.

The remains which illustrate the development of the human mind are not so scarce. A single man might easily manufacture hundreds or even thousands of implements in the course of a lifetime. When these are of stone they are practically imperishable; whereas it is only the exceptional skeleton, protected by favorable circumstances, of which the bones will endure for thousands of years. For every ancient true fossil trace of man that has been found, we have therefore thousands of the works of his hands.

The inadequateness of the cultural record is not in the insufficient number of the specimens, but in their onesidedness. Objects of stone, even those of horn and of metal, last; clothing, fabrics, skins, basketry, and wooden articles ordinarily decay so rapidly as to have no chance of being preserved for tens of thousands of years. Tools of the most ancient times have often been found in abundance; objects manufactured with tools from softer and less enduring materials are scarce even from moderately old periods. Now and then a piece of an earthenware pot may show the imprint of a textile. Textiles and foodstuffs are occasionally preserved by charring in fire or by penetration of metallic salts. Charcoal or ashes found in pockets or beds indicate that fire was maintained in one spot for considerable periods, and must therefore have been controlled and used, possibly even produced, by human agency. A bone needle with an eye proves that some one must have sewn, and one may therefore assume that garments were worn at the time. But for every point established in this way there are dozens about which knowledge remains blank.

Understanding of the social and religious life of the earliest men is naturally filled with the greatest gaps, and the farther back one goes in time, the greater is the enveloping darkness. The problem is as difficult as that of figuring accurately the degree of intelligence attained by the mailed fishes of the Devonian age some thirty or forty million years ago, or of estimating whether the complexion of Pithecanthropus was black, brown, or white. One can guess on these matters. One may by careful comparisons obtain some partial and indirect indication of an answer. But it is clearly wisest not to try to stretch too far the conclusions which can be drawn. Imagination has its value in science as in art and other aspects of life, yet when it becomes disproportionate to the facts, it is a danger instead of an aid.

Still, now and then something has been preserved from which one may draw inferences with a reasonable prospect of certainty even concerning the non-material side of life. If human bones are discovered charred and split open, there is good reason for believing these bones to be the remains of a cannibal feast. When prehistoric skeletons are found in the position in which death might have taken place, the presumption is that the people of that time abandoned their dead as animals would. If on the other hand a skeleton lies intact with its arms carefully folded, there is little room for doubt that the men of the time had progressed to the point where the survivors put away their dead; in other words, that human burial had been instituted, and that accordingly at least some rude form of society was in existence. When, perhaps from a still later period, a skeleton is found with red paint adhering to the bones, although these lie in their natural places, the only conclusion to be drawn is that the dead body was coated with pigment before being interred and that as the soft tissues wasted away the red ocher came to adhere to the bones. In this case the painting was evidently part of a rite performed over the dead.

66. Stone and Metals

The cultural record of man's existence is divided into two great periods. In the latter of these, in which we are still living, metals were used; in the earlier, metals were unknown and tools made of stone. Hence the terms "Age of Stone" and "Age of Metals." The duration of these two main periods is unequal. Metals were first used in Asia and Egypt about 4,000 B.C. and in Europe about 3,000 B.C.—say five to six thousand years ago. The most conservative authorities, however, would allow forty or fifty thousand years for the Stone Age; while others make it cover a quarter million. The assumption, which is here followed, of the intermediate figure of a hundred thousand years gives the Stone Age a duration twenty times as long as the Age of Metals. When one remembers that hand in hand with metals came the art of writing and an infinite variety of inventions, it is clear that larger additions have been made to human civilization in the comparatively brief period of metals than in the tremendously longer time that preceded it. Progress in the Stone Age was not only slow, but the farther back one peers into this age, the more lagging does the evolution of human culture seem to have been. One can definitely recognize a tendency toward the acceleration of evolution: the farther advancement has got the faster it moves.

The Age of Metals is subdivided into the Iron Age, which begins some three thousand years ago, say about 1,500-1,000 B.C.; and an earlier Bronze Age. In the Bronze Age one must distinguish first a period in which native copper was employed in some parts of the world; after which comes an era in which it had been learned that copper melted with a proportion of about one-tenth tin, thus producing bronze, was a superior material. Within the past five thousand years or so, accordingly, there are recognized successively the ages of copper, of bronze, and of iron.

Broadly speaking, these five thousand years are also the historic period. Not that there exist historic records going back so far as this for every people. But the earliest preserved documents that the historian uses, the written monuments of Egypt and Babylonia, are about five thousand years old. The Age of Metals thus corresponds approximately with the period of History; the Stone Age, with Prehistory.

67. The Old and the New Stone Ages

The Stone Age, apart from a rather doubtful introductory era to be mentioned presently, is customarily divided into two periods, the Old Stone Age and the New Stone Age,—the Palæolithic and the Neolithic. These words of Greek origin mean literally "old stone" and "new stone" periods. The criterion by which these two grand divisions were originally distinguished was that in the Palæolithic artifacts were made only by chipping, that is, some process of fracturing stone, whereas Neolithic stone objects were thought to have been pecked, ground, rubbed, and polished. Indeed the two periods have sometimes been designated as the epochs of rough stone and polished stone implements.

This distinction is now known to be inaccurate. It is true that the Old Stone Age did not yet employ frictional processes in shaping stone and confined itself to the older methods of fracturing by blows or pressure. But the converse is not true, that the Neolithic worked stone only by grinding, nor even that grinding was its characteristic process. Stone grinding was invented only toward the middle of the New Stone Age—in what is perhaps best designated the "Full Neolithic." The Early Neolithic, which lasted half the total Neolithic duration, continued to work stone by fracture. What marked the beginning of the Neolithic was certain inventions having nothing to do with stone: notably pottery and the bow. With these available, human life took on a new color, and it was not until some thousands of years later that shaping of stone by grinding came into use. In other words, the prehistorians' idea as to what constitutes the Neolithic have changed, and they no longer put stone processes in the first place in characterizing the period. They would do well, therefore, to change its name also to one having reference to its more specific traits. Such a change of designation will perhaps become established in time. But at present the term Neolithic is so intrenched in usage, that to replace it by "Pottery Age" or "Bow Age" would be misleading: all the literature on the subject employs "Neolithic." The present chapter being concerned specifically with the Palæolithic, and this being an age in which stone implements did loom large and were consistently made by fracture only, the difficulties about the concept of the Neolithic, and its subdivision into an Early and a Full period, can be reserved for discussion later (Chapter XIV). But it is well to bear in mind as the Palæolithic is examined in the pages immediately following, that the Neolithic is neither its antithesis nor its logical complement, but rather a period signalized by the appearance of totally new directions of human culture.

Another point in connection with the two processes of working stone has reference to the mental activities involved by them. A tolerable ground ax or mortar can be made without much difficulty by any one willing to take the trouble. A civilized person entirely inexperienced in the working of stone would be likely to produce a fairly satisfactory implement by the rubbing technique. If however he attempted to manufacture a chipped stone tool, even of simple type, he would probably fail repeatedly before learning to control the method well enough to turn out an implement without first ruining a dozen. In short, the manual dexterity required to produce the best forms of chipped stone tools is greater than that needed for ground ones. Inasmuch as the chipping process is, however, the earlier, we are confronted here with a paradox.

Yet the paradox is only on the surface. It is true that so far as skill alone is concerned a good chipped tool is more difficult to make than a ground one. But it can be made in a shorter time. A rough stone tool can be manufactured in a few minutes. A good artifact may be preceded by a number of unsuccessful attempts or ''rejects,'' and yet be produced in an hour or less. The processes of pecking, grinding, and polishing, on the other hand, are laborious. They are slow even when pursued with steel tools, and when the shaping material is no better than another stone or sand, as was of course always the case in prehistoric times, the duration of the labor must have been discouraging. Weeks or at least days would be required to manufacture a single implement. If the work was done at odd times, one may imagine that many a stone ax was months in being produced. Patience and forethought of a rather high order are thus involved in the making of implements of the Neolithic type. Dexterity is replaced by higher qualities of what might be called the moral order. By comparison, the earliest men lacked these traits. They would not sit down to-day to commence something that would not be available for use until a month later. What they wanted they wanted quickly. To think ahead, to sacrifice present convenience to future advantage, must have been foreign to their way of life. Therefore they chipped; and although in the lapse of thousands of years they learned to do some chipping of high quality, they continued to operate with modifications of the same rough and rapid process. The uses to which their implements could be put were also correspondingly restricted. A first-class ax, a real chisel, or a mortar in which grinding can be done, can scarcely be made by chipping alone. It was not until men had learned to restrain their childish impulse to work only for the immediate purpose, and had acquired an increased self-control and discipline, that the grinding of stone came into use.

One principle must be clearly adhered to in the dating or proper arrangement of the periods of prehistoric time: the principle that it is always the highest types of implements which determine the age of a deposit. Lower forms often persist from the earlier periods into the later, alongside the newly invented higher types. The men of the Full Neolithic time did not wholly give up making chipped implements because they also ground stone. Just so we have not discarded the use of stone because we use metals, and we still employ copper for a great variety of purposes although we live in an age of which iron and steel are characteristic. To reckon a people as Palæolithic because they had chipped implements as well as ground ones, would be as misleading as to assert that we still belong to the Stone Age because we build houses of granite. In fact, stone masonry has had its principal development since metals have been in use.

This caution seems elementary enough. But it has sometimes been overlooked by scholars in the pursuit of a theory that made them try to stamp some prehistoric or savage race as particularly primitive. If in a stratum of ancient remains there are discovered a thousand chipped artifacts and only ten that are ground or polished but the latter unquestionably left there at the same time as the thousand chipped ones, one is justified in reckoning the whole deposit as Full Neolithic in period. For in such a case it is clear that the art of grinding must have been already known, even though it may as yet have been practised only occasionally.

It is found that all surviving peoples of primitive culture—American Indians, Australian black-fellows, Polynesians, Hottentots, and the like—except probably the Tasmanians, have attained the grinding stage of development. It is true enough that many American Indian tribes chipped arrow-points and knives more frequently than they would grind out axes. Yet without exception they also knew the process of grinding stone and applied it to some purpose. For this reason the endeavors that have been made by certain authors, who compare particular modern savage peoples to the races of prehistoric Europe on the basis of a similarity of their chipped implements, are misleading. It is true that tools like those produced in the Mousterian period of the Old Stone Age are made by the modern Australian tribes, and that certain Magdalenian implements from near the end of the Old Stone Age find parallels among those of the Eskimo. But both the Australians and the Eskimo practise the art of rubbing and polishing of stone, which was unknown in the Palæolithic. They therefore belong clearly to a later stage of civilization. Too great an insistence on such parallels would be likely to give rise to the implication that the Australians were a species of belated Mousterian Stone Age men, and the Eskimo only Magdalenians whom the Arctic regions had somehow perpetuated for ten thousand years; whereas their civilizations consist of Mousterian and Magdalenian ingredients plus many subsequent elements. The stage of development of the art of chipping in stone may be the same; the other arts and customs of modern Australian black-fellows and of Eskimos, and their bodily types, differ from those of the prehistoric Europeans.

With the distinction of the Palæolithic, Neolithic, and the Ages of Copper, Bronze, and Iron in mind, it is in order to examine what may have preceded them, and then to trace in outline the development which human culture underwent during the Palæolithic in the continent in which its records are best explored—Europe.

68. The Eolithic Age

The earliest of all periods of human handiwork, although a somewhat doubtful one, is the Eolithic, or age of the "dawn of stone" implements.

On purely theoretical grounds it appears likely, indeed almost inevitable, that the first definitely chipped implements did not develop full-fledged, but were preceded by still cruder tools, made perhaps without clear intent, and at any rate so rough and half-shaped that they would be difficult to recognize.

After the evolution of Palæolithic implements had become pretty well known, this conjecture began to be supported by evidence, or at least by alleged evidence. Investigators, especially Rutot in Belgium, found flints of which it was difficult to say whether or not they had been used by human hands. These pieces occurred in extremely ancient deposits. On the basis of these discoveries Rutot and his followers established the Eolithic period. Some have consistently assailed this Eolithic age as imaginary, asserting that the so-called eoliths were nothing but accidental products of nature. Others have accepted the eoliths and recognize the stage of embryonic or pre-human civilization which they imply. Still other students remain in doubt; and their attitude is perhaps still the safest to share.

The view now most prevalent is that the alleged Eolithic flints may have been used by early human hands, but that they were almost certainly not manufactured. This would make them tools only in the sense in which the limb of a tree is a tool when a man in distress seizes it to defend himself.

The eoliths are more or less irregular pieces of flint or similar stone, some of them so blunt that they must have been very inefficient if used for chopping or cutting or scraping. Small nocks or chips along the edge are believed not to have been flaked off with the conscious intent of producing an edge, but to have become chipped away through usage while the stone was being manipulated as a naturally formed tool. This would be much in line with our picking up a cobblestone in default of an ax or hammer, and continuing to maul away with it until the rough handling broke off several pieces and happened accidentally to produce an edge. That the eoliths were such unintentionally made tools is the most that can safely be claimed for them.

Even so some doubts remain. Stones similar to eoliths in every respect, except that their fractures show a fresher appearance, have been taken by dozens out of modern steel drums in which flint-bearing chalk was being broken for industrial purposes.

Then, too, the first believers in the authenticity of the eoliths reported them as occurring from the middle and earlier layers of the Pleistocene, in which periods we know that nearly human or half-human types like Heidelberg man and Pithecanthropus were already in existence. These two species being more similar to modern man than to the apes or other animals, we must imagine them to have been gifted with at least some human intelligence. It would therefore have been entirely possible for them to supplement the tools with which nature endowed them —their hands and teeth—with flints which they picked up and manipulated in one useful way or another without particularly troubling to shape the stones.

So far the argument is all in favor of the reality of the eolith. Before long, however, it was discovered that eoliths were not especially more abundant in the middle Pleistocene just previous to the opening of the Palæolithic, when we should expect them to have been most numerous, than they were in the early Pleistocene, when the human species must still have been most rudimentary. Then it was found that eoliths occur in lower strata than the earliest Pleistocene, namely, in the Pliocene, in the Miocene, and perhaps even earlier, in the Oligocene. Yet these periods are divisions of the Tertiary, or Age of Mammals —the age before man had been evolved! In short, the argument cuts too far. Once one begins to accept eoliths it is difficult to stop accepting them without carrying them back into a period of geological history when evolution could scarcely have produced a form sufficiently advanced in intelligence to use them.[1]

Perhaps on the whole the strongest argument in favor of the authenticity of the Pleistocene eoliths is the fact that the first implements known positively to belong to the Old Stone Age are just a little too well shaped and efficient to represent the products of the very beginnings of human manual dexterity. One cannot help but look for something antecedent that was simpler and ruder; and this need of the imagination the eoliths do go a long way to satify.

69. The Palæolithic Age: Duration, Climate, Animals

With the Eolithic period passed and the Palæolithic entered, our history of incipient human culture is on a solid foundation, especially so far as western Europe, the best explored region, is concerned. The general relation of this Old Stone Age in geological time may be defined as follows. The Quaternary, whose duration may be estimated to have been about a million years, is subdivided into the Pleistocene and the Recent. Of the two, the Recent is very much shorter than the Pleistocene. Broadly speaking, from ninety-eight to ninety-nine per cent of the total duration of the Quaternary was occupied by the Pleistocene. The small remainder which the geologist calls "Recent," corresponds to those periods which the archæologist and the historian name the New Stone and Metal Ages; say the past ten thousand years. The Old Stone Age therefore falls in the Pleistocene. But it occupies only the later duration of the Pleistocene; the earlier part of the Pleistocene is barren of tools or other records of human culture, except so far as the eoliths may be so considered.

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[1] Recently, certain "rostro-carinate" pre-Palæolithic implements have been much discussed by British archæologists, and in the past year or two there have been some adherents of other nationalities. The implements are referred in part to the Pliocene, that is, late Tertiary, and are said to be accompanied by hearths. The evidence to be adjudicated is technical, and some years will probably elapse before expert opinion settles into tolerable agreement on the authenticity of the objects as artifacts and their age.

The proportion of the Pleistocene which is covered by the Old Stone Age is variously estimated. Some geologists will not allow the undisputed Palæolithic to have extended over more than the last tenth of the Pleistocene: the rivers have not changed their beds enough to permit the assumption of a longer period. This allowance would give the Palæolithic a duration of perhaps a hundred thousand years, which is the figure here followed. Those who place the beginning of the European Palæolithic in the second instead of the third interglacial period, would have to admit a considerably longer duration.

The geologist, because he deals with such enormous durations, has to operate on a broad-gauge scale, and usually disdains to commit himself to close estimates of years. To measure the lapse of time within the Pleistocene, he has found it most useful to avail himself of the evidences left by the great glaciers which repeatedly covered parts of several continents during the Pleistocene, and he has therefore given this period its popular name of "glacial epoch." These glaciations must be imagined as having occurred on a much larger scale than one might at first infer from the shrunken remnants of the glaciers that persist in the Alps and other mountains. The Pleistocene glaciers were vast sheets, hundreds of feet in thickness, sliding uniformly over valleys, hills, and mountains except for an occasional high peak. Modern Greenland, which except at the edges is buried under a solid ice cap, evidently presents a pretty fair picture of what the northern parts of Europe and North America repeatedly looked like during the Pleistocene.

Four such glaciations, or periods of maximum extent of the continental ice, have been distinguished, and more or less correlated, in Europe and North America. In Europe they have been designated as the Günz, Mindel, Riss, and Würm glaciations respectively (Fig. 5). Each of these is the name of a locality in the Alps at which typical moraines or erosions produced by the ice of that period have been carefully observed.

Between these four successive advances of the ice sheets there fell more temperate eras, some of them rather arid, and others moist and almost tropical even in the latitude of Europe. These mild intervals are known as the interglacial periods. That Europe was free from ice during these interglacial periods is shown not only by facts of a purely geological nature but by the occurrence in these periods of fossils of a semi-tropical fauna which included elephants, rhinoceroses, lions, and the like.

Coming now to a consideration of the relation of man to these ice eras, we find that the first, second, and probably the third glaciations passed without leaving sure evidence of manufactured stone implements. In the last interglacial period, that which falls between the Riss and the Würm glaciations, the so-called "Chellean picks" appear; and from then on the record of artifacts is a continuous one. Considerable parts of Europe remained habitable all through the fourth and last glaciation, the Würm period, as the implements discovered prove. Gradually, although irregularly and with three minor advances and recessions, always diminishing in rigor, however, this last predominance of the ice died away; until, by the time its effects had wholly disappeared, and the geologically "Recent" era was inaugurated, human civilization had evolved to a point where it began to enter the New Stone Age.

The animals whose fossils are found in the same deposits with human skeletons and artifacts have been of the greatest assistance in the determination of the periods of such remains. The fossils are partly of extinct species until toward the very end of the Pleistocene, when exclusively living types of animals begin wholly to supersede the earlier ones. While the identification of the various species, and the fixation of the age of each, is the work of the specialist in palæontology, the results of such studies are all-important to the historian of man's beginnings, because they help to determine chronology. If artifacts are found in association with fossil remains of an extinct animal such as the mammoth or the woolly rhinoceros, they are obviously older than artifacts that are accompanied only by the bones of the reindeer, the dog, or other living species. For this reason, although the history of mammalian life in the past is a science in itself, it also has close relations with human prehistory. Some of the most characteristic animals of the later Pleistocene, and the successive stages of human cultural development with which they were associated, are listed on the following page.

70. SUBDIVISIONS OF THE PALÆOLITHIC

The places at which the men of the Stone Age lived and where their debris accumulated are known as "stations." The word was first employed in this sense in French, but has been taken over into other languages. A "station" then is simply a spot at which prehistoric remains of human occupation are found. At least a thousand of these have been discovered in western Europe. In general they divide into two classes. One kind is in the open, mostly in the gravels laid down by streams. These are therefore known as "River Drift" or simply "Drift" stations. The other kind is found in caves or under sheltering rocks. The majority of Drift stations have proved to be from the earlier or Lower Palæolithic, whereas the Cave stations date mostly from the later or Upper Palæolithic. The Drift and the Cave periods are therefore often distinguished within the Old Stone Age, especially by English archæologists. French, German, and American students generally use the terms "Lower Palæolithic" and "Upper Palæolithic," whose reference is to periods of cultural development rather than type of locality inhabited, and which carry more significance. French archæologists also speak of the Upper Palæolithic as the Reindeer Age.

The student who perhaps contributed most to the foundation

THE LATER GLACIAL FAUNA OF WESTERN EUROPE

(Read upward)

Postglacial and Recent:

Bison, *Bison priscus.*
Wild cattle, *Bos primigenius.*
Red deer or stag, *Cervus elaphus.*
Roe-deer, *Capreolus.*
Reindeer, *Rangifer tarandus.*
Wild boar, *Sus scrofa.*

Fourth Glacial and Postglacial fauna: typically Mousterian to Magdalenian:

Woolly mammoth, *Elephas primigenius.*
Woolly or Siberian rhinoceros, *Rhinoceros antiquitatis.*
Cave lion, *Felis leo spelaea.*
Cave hyaena, *Hyaena crocuta spelaea.*
Cave bear, *Ursus spelaeus.*
Horse, *Equus caballus.*
Ibex.
Banded lemming, *Myodes torquatus.*

Third Interglacial fauna: typically Chellean and Acheulean:

Straight-tusked elephant, *Elephas antiquus.*
Broad-nosed rhinoceros, *Rhinoceros Merckii.*
Lion, *Felis leo antiqua.*
Spotted hyaena, *Hyaena crocuta.*
Brown bear, *Ursus arctos*
Horses, probably several varieties.

Second Interglacial Fauna: typically Pre-Palæolithic, but in part surviving into the Chellean in favored localities:

Southern mammoth, *Elephas meridionalis.*
Etruscan rhinoceros, *Rhinoceros etruscus.*
Hippopotamus major.
Saber-tooth tigers, *Machaerodus.*
Striped hyaena, *Hyaena striata.*
Steno's horse, *Equus stenonis.*
Bison antiquus.
Mastodon, tapir, anthropoids, and all primates but man and the macaque monkey already extinct in Western Europe.

of knowledge of the Palæolithic period was Gabriel de Mortillet. He first recognized four distinct sub-periods of the Palæolithic, each possessing its distinctive kinds of implements. These four periods, each named after one particular "station," are the Chellean or earliest; the Mousterian; the Solutrean; and the Magdalenian or latest. These derived their designations from the four stations of Chelles in northern France, and of Le Moustier, Solutré, and La Madeleine in southern France (Fig. 16). De Mortillet did not endeavor to relate the culture of each of these four periods wholly to the particular locality for which he named it. He chose the stations as typical and included others as belonging to the same eras.

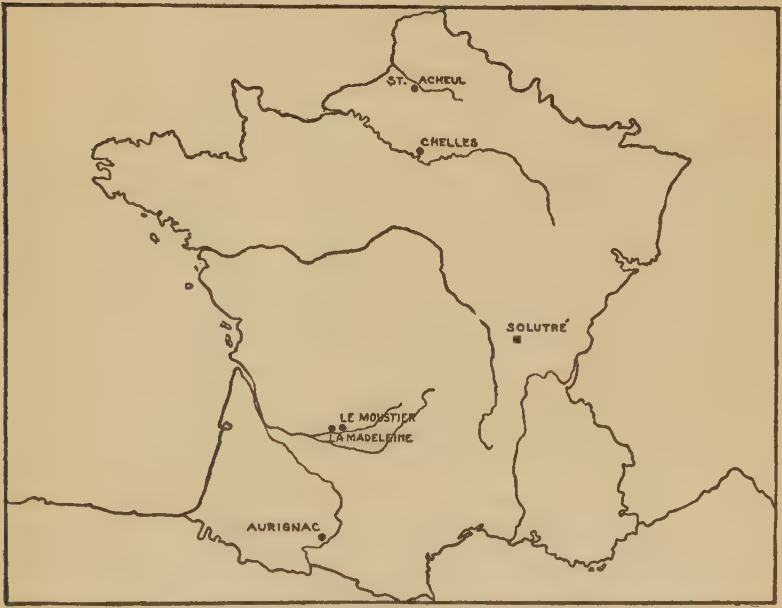

FIG. 16. Type stations of the Palæolithic periods. (After Osborn.)

As more implements were found and studied, it was recognized, in part by de Mortillet himself, that while his original classification was sound, it was also incomplete. Two other periods had to be admitted. One of these, the Acheulean, falls before the Mousterian, and the second, the Aurignacian, after it. This makes six periods within the Old Stone Age; and these have been adopted by all students of the prehistory of man in Europe. The first three, the Chellean, Acheulean, and Mousterian, make up the Lower Palæolithic; the last three, the Aurignacian, Solutrean, and Magdalenian, constitute the Upper Palæolithic or Reindeer Age. These six divisions of the Old Stone Age are so essential to an understanding of the prehistory of man, that the serious student finds it necessary to know their names and sequence automatically.

71. Human Racial Types in the Palæolithic

When it comes to defining the types of fossil man in the Palæolithic, a curious situation develops. Long before there was even a true Stone Age, in the early and middle Pleistocene, there lived the half-human Pithecanthropus and the primitively human Heidelberg race (§ 11, 12). But for the whole first part of the Palæolithic, throughout the Chellean and Acheulean, no undisputed find of any skeletal remains has yet been made, although thousands of implements have been discovered which are undoubtedly human products.[1]

In the present state of knowledge the strongest case is that for the skull found at Piltdown in southern England. This is said to have been associated with "Pre-Chellean" tools, which would seem to establish the Piltdown type as the race that lived about the beginning of the Palæolithic (§ 13). But the deposit at Piltdown had been more or less rolled or shifted by natural agencies before its discovery, so that its age is not so certain as it might be; and there is no unanimity of opinion as to whether the highly developed skull and the excessively ape-like jaw that were found in the deposit really belong together. With this doubt about the fossil itself, it seems most reasonable not to press too strongly its identification as the type of man that lived in Europe at the commencement of the Old Stone Age.

For the end of the Lower Palæolithic, in the Mousterian, conditions change, and skeletal remains become authentic and comparatively numerous. From this period date the skeletons of the Neandertal species of man: a short, thickset race, powerful in bones and musculature, slightly stooping at the knee and at the shoulder, with a thick neck and a large head (§ 14). The brain was about as large as that of modern man, but the retreating aspect of the forehead was accentuated by heavy brow ridges.

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[1] The Krapina bones (§ 14) are by some assigned to the Chellean or Acheulean.

In the Upper Palæolithic the Neandertal species has disappeared. The first precursors of Homo sapiens, or modern man, have come on the scene. A sort of transition from Neandertal man may be presented by the Brünn type, but the prevailing race in western Europe during the Upper Palæolithic period is that of Cro-Magnon, a tall, lithe, well-formed people, as agile and swift as Neandertal man was stocky and strong. The head and features were well proportioned, the skull and brain remarkably large, the general type not inferior to modern man, and probably already proto-Caucasian (§ 16).

Grimaldi man, so far known only from one spot on the Mediterranean shore of Europe, was proto-Negroid, Aurignacian in period, and therefore partly contemporaneous with the Cro-Magnon race (§ 18).

In summary, the types of man in Europe during the Old Stone Age have been as follows:

Magdalenian	Cro-Magnon
Solutrean	Cro-Magnon; Brünn
Aurignacian	Cro-Magnon (Caucasian); also, locally Grimaldi (Negroid)
Mousterian	Neandertal (possibly without living descendants)
Acheulean	Unknown
Chellean	Unknown; Piltdown perhaps Pre-Chellean

The interrelations of geology, glaciation, human types, periods of the Stone Age, and estimated time in years are brought together in the tables "Antiquity of Man" and "Prehistory" (Figs. 5 and 17.)[1]

72. Palæolithic Flint Implements

The most important line of evidence as to the gradual development of civilization through the six periods of the Old Stone

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[1] It will be noted that the second of these tables is an amplification of the upper part of the first.

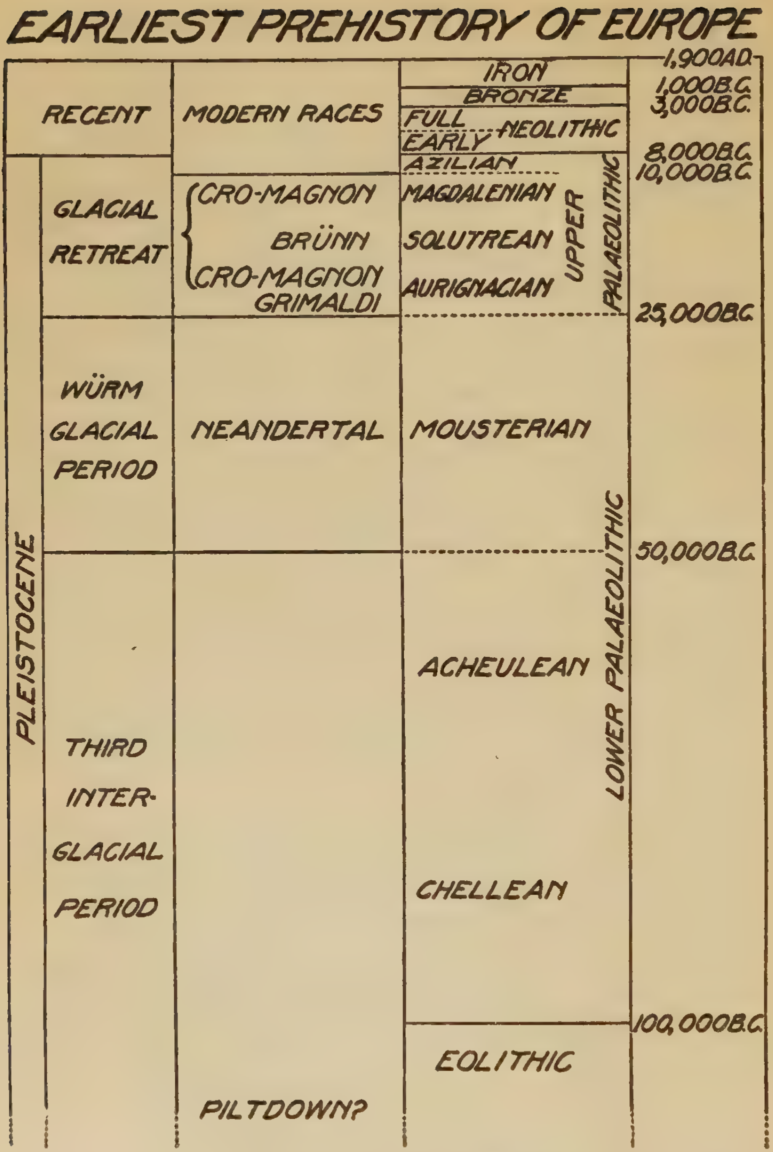

Fig. 17. Earliest Prehistory of Europe. This table is an elaboration of the upper portion of Figure 5. Equal lapses of time are indicated by equal vertical distances. The general acceleration of development is evident.

Age is the series of flint tools. Hundreds of thousands of these tools have been discovered in western, central, and southern Europe—perhaps millions. At St. Acheul were found 20,000 Chellean coups-de-poing; at Solutré, below the Solutrean layer, 35,000 Mousterian-Aurignacian worked flints besides the remains of 100,000 horses; at Grimaldi in Italy, in the Grotte du Prince, 20,000 Mousterian pieces; at Schweizersbild in Switzerland, 14,000 late Magdalenian implements, and at Kesslerloch, near by, 30,000 from the late Solutrean and Magdalenian; at Hundsteig in Austria, 20,000 Aurignacian flints; at Predmost in Czecho-Slovakia, 25,000 probably of Solutrean age. Stations of such richness are not particularly rare, and the stations are numerous. In France alone 500 Magdalenian stations have been determined.

Clear stratigraphic relations have also been observed again and again. A few examples are:

Castillo Cave, Santander, Spain, implement bearing layers separated by strata of sterile natural debris: 1, Acheulean; 2, 3, 4, early, middle, and late Mousterian; 5, early Aurignacian; 6, 7, 8, late Aurignacian; 9, Solutrean; 10, 11, early and late Magdalenian; 12, Azilian; 13, Copper.

At St. Acheul: 1, limestone; 2, gravel, early Chellean; 3, sand, late Chellean; 4, loam, early Acheulean; 5, flood sand; 6, loess; 7, late Acheulean; 8, pebbles, Mousterian; 9, loess; 10, Upper Palæolithic.

At Mas d'Azil, at the foot of the Pyrenees: 1, gravelly soil; 2, middle Magdalenian; 3, flood loam; 4, upper Magdalenian; 5, flood loam; 6, Azilian; 7, early Neolithic; 8, full Neolithic and Bronze; 9, Iron.

At Ofnet cave, Bavaria: 1, rocks; 2, sand, 65 cm. deep; 3, 4, Aurignacian, 20 cm.; 5, Solutrean, 20 cm.; 6, Magdalenian, 15-20 cm.; 7, Azilian, with two nests of skulls, 5 cm.; 8, Neolithic, 53 cm.; 9, Bronze and Iron, 32 cm.

At La Ferrassie cave: 1, rocks and sand, 40 cm. deep; 2, Acheulean, 50 cm.; 3, Mousterian, with skeleton, 50 cm.; 4, early Aurignacian, 20 cm.; 5, middle Aurignacian, 50 cm.; 6, rock fragments, 35 cm.; 7, late Aurignacian, 35 cm.; rock and soil, 120 cm.

At first inspection Palæolithic relics seem scarcely distinguishable. They are all of flint, chert, or similar stone; are all chipped and therefore more or less rough, and consist of forms meant for cutting, scraping, and piercing. But a closer examination reveals differences in their shapes and fundamental differences in the method of their manufacture. The technique employed in the fashioning of artifacts is more significant than their appearance, and it is by directing attention to the process that one can classify these "fossils of civilization" with accuracy.

Chellean.—In the Chellean period there was made substantially one type of implement, a sort of rude pick, almond or wedge shaped. It is often somewhat pointed, although rarely very sharp. The butt end may be rounded, some of the original surface of the cobble or nodule of flint being left for convenience of the hand in grasping the implement (Fig. 18, *a*). This tool is known as the "Chellean pick." The Germans often call it *faust-keil* or "fist wedge" and the French have coined the expressive epithet *coup-de-poing* or "blow of the fist." The Chellean pick averages from four to six inches in length, somewhat less in breadth, and weighs perhaps from a quarter to a full pound. It would have made an effective rude weapon. When firmly grasped and well directed, it could easily crush a skull. It might serve to split wood, hack limbs from trees, butcher large game, and perhaps roughly dress hides. It would not do any one of these things with neatness and accuracy, but neatness and accuracy were qualities to which early Palæolithic men paid little attention. This universal Chellean tool may be described as a combined knife, saw, ax, scraper, and pick, performing the various functions of these implements with notable crudities but efficiently enough when wielded with muscular strength.

The Chellean pick was made by striking a round or oval nodule of flint with another stone and knocking off pieces. Most of the detached flakes were large, as shown by the surfaces from which they came off; perhaps most of the chips averaged a square inch. Anything like fine work or evenness of outline was therefore out of question. One can imagine that many tools were spoiled, or broken in two, by the knocks to which they were subjected in their manufacture. The flakes struck off fell to the ground and were discarded. If the workman was sufficiently skilful, and luck stayed with him, he would before long be holding the sort of implement that has been described. Not

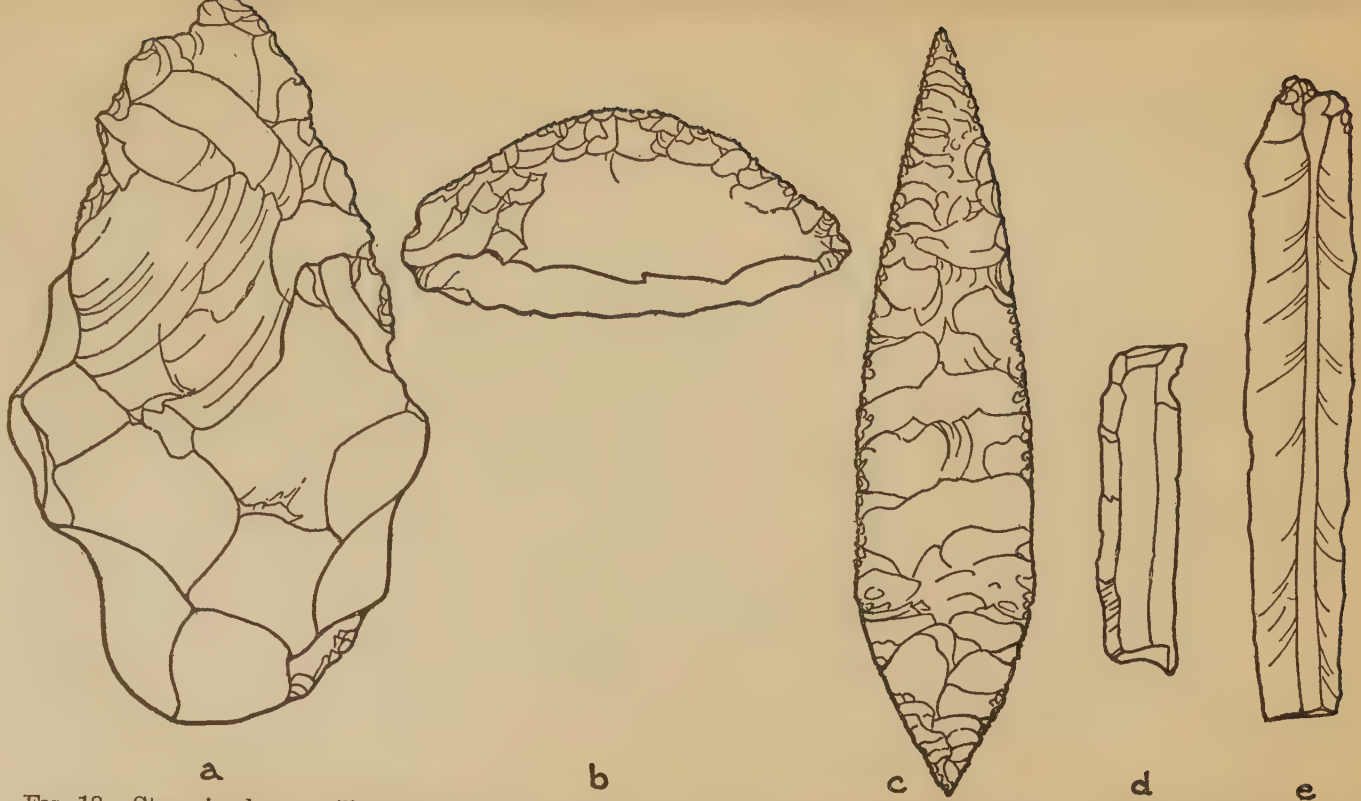

FIG. 18. Stone implements illustrating the principal types of Palæolithic chipping. *a*, Chellean pick, a roughly flaked core; *b*, Mousterian scraper, a flake with retouched edge; *c*, Solutrean blade, evened by retouching over its entire surface; *d*, Magdalenian knife, a flake detached at one blow. For comparison, *e*, an obsidian knife or razor from Mexico, made by the same process as *d*.

more than a few dozen strokes of the hammer stone would be required to produce it.

Some attempt has been made to distinguish variant forms of Chellean tools, such as scrapers, planers, and knives. But some of these identifications of particular types are uncertain, and at best, the differences between the types are slight. It may be said with approximate accuracy that the long Chellean period possessed only the one tool; that this is the first definitely shaped tool known to have been made by human hands; and that it is therefore the concrete evidence of the first stage of that long development which we call civilization.[1]

Acheulean.—The Acheulean period brings to light a growing specialization of forms and some new types. Rude scrapers, knives, borers, can be distinguished. The flakes struck off are finer than in the Chellean and the general workmanship averages higher; but through the whole of the Acheulean there is no new process. The Chellean methods of manufacture are improved without an invention being added to them.

Mousterian.—In the Mousterian period a retrogression would at first sight seem to have occurred. Tools become smaller, less regular in outline, and are worked on one side only. The whole Mousterian period scarcely presents a single new type of implement of such all-around serviceability as the Chellean pick. Nevertheless the degeneration is only in the appearance of the implements. Actually they are made by a new process, which is more advanced than that followed in the Chellean and Acheulean. In these earlier periods flakes were struck off until the kernel of stone that remained was of the shape desired for the tool. The Mousterian technique is distinguished by using the flake instead of the core. This is the cause of Mousterian tools being generally smaller and lighter.

Secondly, when the flake dulled by use, its edge was renewed by fine chipping. The pieces detached in this secondary chipping are so small that it would have been difficult to knock them off and maintain any regularity of edge, for to detach a chip by a blow means violent contact. If the blow is a bit feeble, the chip that comes off is too small. If the artifact is struck too hard, too large a chip flies off and the implement is ruined. Fine chips are better worked off by pressure than by impact. A point is laid upon the surface near the edge. When this point is pressed down at the proper angle and with proper firmness, a scale flies off. With some practice the scales can be detached almost equal in size. The point may be of softer material than the stone. It is in the nature of flint, and of all stones that approach glass in their structure, that they break easily under pressure in definite planes or surfaces. Modern tribes that still work flint generally employ as a pressing tool a piece of bone or horn which comes to a somewhat rounded point. This is usually attached to the end of a stick, to enable a better grip of the working tool, the butt end being clamped under the elbow. A tool of the same sort may have been employed in the Palæolithic. The process of detaching the scales or secondary flakes by pressure is known as ''retouching.'' Retouching allows finer control than strokes delivered with a stone. The result is that Mousterian implements, when at their best, possess truer edges, and also greater variety of forms adapted to particular uses, than those of preceding ages (Fig. 18, *b*).

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[1] A Pre-Chellean period, without large picks, and associated with the Second Interglacial fauna (§ 69, 214), is recognized by some specialists.

In spite of their insignificant appearance, Mousterian tools accordingly show advance in two points. First, the flake is used. Secondly, two processes instead of one are followed; the knocking off of the flake followed by its retouching.

Aurignacian.—With the Mousterian the Lower Palæolithic has ended. In several activities of life, such as art and religion, the Upper Palæolithic represents a great advance over the Lower Palæolithic. Yet it seems that the mental energies of the Aurignacian people must have been pretty well absorbed by their new occupations and inventions, for their tools are largely the same retouched flakes as those the Mousterian had already employed. The Aurignacian carried on the stone technique of the Mousterian much as the Acheulean previously had carried on that of the Chellean.

Solutrean.—The Solutrean seems to have been a relatively brief period, and to have remained localized, for implements dating from it are the scarcest of any from the six divisions of the Old Stone Age. There was a distinct advance of interest in stone work during the Solutrean. The process of retouching, without being fundamentally altered, was evidently much better controlled than before. The best Solutrean workers were retouching both sides of their tools instead of one side only, as in the past, and working over not only the edge or point but the entire surface of their artifacts. One of the characteristic implements of their time was a laurel-leaf-shaped blade which has often been considered a spear point, but would also have been an effective knife and may often have been used as such. This has the surface of both sides, from tip to butt, finished in even retouching, and is equaled in excellence of workmanship only by the best of the spear points chipped by modern savages (Fig. 18, *c*).

Of course this was not the only stone implement which the Solutrean people knew. They made points with a single shoulder at the butt, as if for mounting, and had crude forms which represented the types of earlier periods. This partial conservatism is in accord with the general observation already stated, that lower types tend to persist even after higher ones have been invented; and that because a period is determined by its best products it by no means follows that simpler ones are lacking.

Magdalenian.—The sixth period of the Old Stone Age, the Magdalenian, resembles the Mousterian in seeming at first glance to show a retrograde development. The retouching process was carried out with less skill, perhaps because the Magdalenians were devoting themselves with more interest to bone than to stone. Magdalenian retouched implements are less completely worked out and less beautifully regular than those of Solutrean times. One reason for this decline was that another technique was coming to prevail. This technique had begun to come into use earlier, but its typical development was Magdalenian. It was a process which, on account of its simplicity, once it was mastered, was tending to make the art of retouching unnecessary. This new method was the trick of detaching, from a suitable block of flint, long straight-edged flakes, by a single blow, somewhat on the principle by which a cake of ice can be split evenly by a well guided stroke of the pick. The typical Magdalenian implement of stone is a thin flake several inches long, triangular or polygonal in cross section; in other words, a long narrow prism (Fig. 18, *d*).

To detach such a flake, flint of rather even grain is necessary, and the blow that does the work must be delivered on a precise spot, at a precise angle, and within rather narrow limits of force. This means that the hammer or striking tool cannot well come in direct contact with the flint. A short pointed piece, something like a nail or a carpenter's punch, and probably made in the prehistoric days of horn or bone, is set on a suitable spot near the edge of the block of flint, and is then tapped smartly with the hammer stone. A single stroke slices off the desired flake. The sharp edges left on the block where the flake has flown off can be used to start adjacent flakes, and thus all the way round the block, the workman progressing farther and farther in, until nearly the whole of his core has been split off into strips.

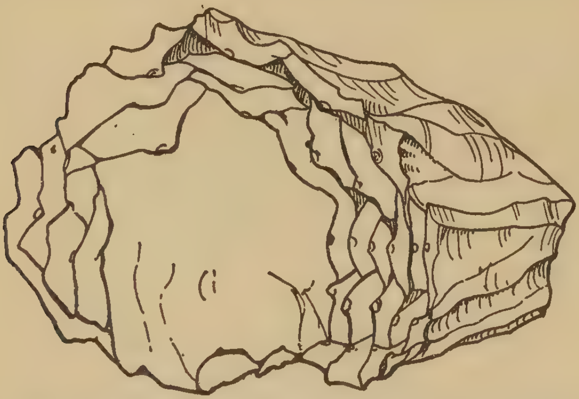

Fig. 19. Flakes struck from a core and reassembled. Modern workmanship in Magdalenian technique.

This Magdalenian process, which was in use ten, fifteen, and perhaps twenty thousand years ago, survived, or was reinvented, in modern times. It is only a few years ago that flints were being struck off by English workmen for use on flintlock muskets exported to Africa. The modern Englishman worked with a steel hammer instead of a bone rod and cobblestone, but his technique was the same. Figure 19 shows the complete lot of flakes into which a block has been split, and which were subsequently laid together so as to reform the stone in its original shape. Similar flakes made of obsidian, a volcanic glass similar to flint in its properties, are still being produced in the Indian districts of interior Mexico for use as razors (Fig. 18, *e*).

The Magdalenian method of flint working gives the smoothest and sharpest edge. It is not adapted for making heavy instruments, but it yields an admirable knife. The process is also expeditious.

Summary.—The successive steps in the art of stone working in the Palæolithic may be summarized thus:

Chellean: Coarse flakes detached by blows from the core, which becomes the implement.
Acheulean: Same process applied to more varied forms.
Mousterian: Flake detached by a blow is sharpened into a tool by retouching by pressure on one side only.
Aurignacian: Same with improved retouching applied.
Solutrean: Both surfaces of implement wholly retouched.
Magdalenian: Prismatic flake, detached by a blow transmitted through a point.

73. OTHER MATERIALS: BONE AND HORN

Stone implements must perhaps always remain in the foreground of our understanding of the Old Stone Age because they were made so much more numerously than other objects, or at any rate have been preserved so much more abundantly, that they will supply us with the bulk of our evidence. At the same time it would be an error to believe that the life of these men of long ago was filled with the making and using of stone tools to the exclusion of everything else. Gradually during the last fifty years, through unremittingly patient explorations and the piecing of one small discovery to another, there has accumulated a fair body of knowledge of other sides of the life of Palæolithic men. There is every reason to believe that as time goes on we shall learn more and more about them, and thus be able to reconstruct a reasonably complete and vivid picture of their behavior.

Implements of bone and horn are next most abundant after those of stone, but it is significant that the Lower Palæolithic still dispensed with these materials. In the Chellean and Acheulean stations, although broken bones of devoured animals occur, bone was not shaped. In the Mousterian this material first came into use, but as yet only as so-called ‘‘anvils’’ on which to chip flint or cut, and not as true tools.

One of the changes that most prominently mark the passage from the Lower to the Upper Palæolithic is the sudden development in the use of bone at the beginning of the Aurignacian, and then of reindeer horn. These materials came more and more into favor as time went on. The Aurignacians had bone awls or pins, polishers, paint tubes of hollowed reindeer leg bone, and points with a grooved base for hafting, generally construed as javelin heads. In the Solutrean, eyed needles were added. The greatest development was attained in the Magdalenian. Bone javelin and spear heads were now made in a variety of forms, with bases pointed, beveled, or grooved. Hammers, chisels or wedges, and perforators were added to the list of bone tools. Whistles and perhaps flutes were blown. Reindeer antler was employed for carved and perforated lengths of horn, ‘‘rods of command’’ or magic, they are usually called; as well as for harpoons and throwers, to be discussed below.

By the close of the Palæolithic, objects of organic substances began to approach in frequency those of flint. This may well have been a sort of preparation for the grinding and polishing of stone which is the distinctive technique of the New Stone Age. Bone cannot well be chipped or retouched. It must be cut, ground or rubbed into shape. The Neolithic people therefore may be said to have extended to stone a process which their predecessors of the Upper Palæolithic were familiar with but had failed to apply to the harder substance.

74. DRESS

The slender bone needle provided with an eye which the Solutrean and Magdalenian added to the primitive awl implies thread and sewing. It may be concluded therefore that, at least from the middle of the Upper Palæolithic on, the people of Europe went clothed in some sort of fitted garments. It would be going too far to assert that the Neandertal men ran about naked as the lower animals. Several inventions which they had made compel us to attribute to them enough intelligence to lead them to cover themselves with skins when they felt cold. But they may have been too improvident, or habituated to discomfort, to trouble even to dress hides. At any rate there is no positive indication that they regularly clothed themselves. By contrast, the sewing of the Upper Palæolithic Cro-Magnons marked a considerable advance.

Ornament may have been earlier than clothing. The paint of the Aurignacians decorated their own bodies and those of their dead. About their necks and waists they hung rows of perforated shells and teeth. More of these have been found on the skeletons of males than of females. By the Magdalenian, there was sophistication enough to lead to the carving of artificial shells and teeth out of ivory; and amber was beginning to be transported from the German coast to Southern France.

75. Harpoons and Weapons

Towards the end of the Upper Palæolithic, in the Magdalenian, the harpoon came into extensive use. The shafts have of course long since decayed, but many of the reindeer antler heads have remained intact. At first these were notched with barbs along one edge only. In the later Magdalenian the barbs were cut on both sides. The harpoon differs from the simple spear or javelin in having its head detachable from the shaft. The two are fitted together by a socket. If the prey, be it fish or mammal, is not killed by the first throw, its struggles to escape shake the shaft loose, while the barbs hold the head firmly imbedded in its body. A line is attached to the head and tied to the shaft or held in the hand of the hunter. The animal is thus kept from escaping. During the Magdalenian the line was kept from slipping off the head by one or two knobs near the butt. In the subsequent Azilian period the head was perforated, as is the modern Eskimo practice. The harpoon is really a rather complicated instrument: it consists of at least three pieces —head, shaft, and line.

Another device which the Magdalenians shared with the Aztecs, the Eskimo, and some other modern peoples, is the spear thrower or atlatl. This is a sort of rod or handle, one end of which is grasped by the fingers while the other engages the butt end of the harpoon or dart. The hand only steers the shaft at the beginning of its flight: the propulsion comes from the thrower. The instrument may therefore be described as a device for artificially lengthening the human arm and thus imparting greater velocity and length of flight to the weapon. There is without doubt considerable ingenuity involved in this apparatus, both in its invention and in its successful use. A person unskilled in bodily movements would never hit upon the invention; nor could a race of high native dexterity acquire proficiency in the art of hunting with the thrower until each individual was willing to practise for a considerable period. It may once more be concluded, accordingly, that by the end of the Palæolithic, civilization had developed to a point where men were much readier to undergo protracted training and forbearance than they had been at the beginning of the period.

One instrument that we are wont to associate with the beginnings of civilization, because of its almost universal employment by savages of to-day, is the bow and arrow. So strong has the preconception been that the Palæolithic peoples must have been like modern savages, that time and time again it has been assumed that they possessed the bow. There is no convincing evidence to show that this was so, and a good deal of negative evidence to establish that they were unacquainted with the weapon. All the Palæolithic remains of flint, bone, or horn, which at times have been interpreted as arrow points, are more conservatively explained as knives or heads of darts. The prevailing opinion is that the bow was not invented until the Neolithic. This would make the weapon only about ten thousand years old —a hoary antiquity, indeed, but recent as compared with the knife, the spear, and even the harpoon. The reason for this lateness in the invention of the bow and arrow is probably to be sought in the delicacy of the instrument. It is not essentially more complex than the harpoon, certainly not more complex than the harpoon impelled by the spear thrower. But it involves much finer adjustments. A poorly made harpoon is of course inferior to a well-made one, but may be measurably effective. It may retrieve game half the time. But a bow which falls below a certain standard will not shoot at all, or will shoot so feebly as to have a zero efficiency. In fact, one of the things that students of the beginnings of culture have long been puzzled about is how the bow and arrow could have been invented. Most other inventions can be traced through a series of steps, each of which, although incomplete, achieved a certain utility of its own. But, other than toys or musical instruments, no implement has yet been found, or even satisfactorily imagined, which was not yet a bow, which would still serve a purpose, and which, by addition or improvement, could give rise to the bow.

76. Wooden Implements

Wood is likely to have been used by primitive men for one purpose or another from the very earliest times. Even ''half men'' of the ''missing link'' type, it may be believed, would in case of need pick up a stick or wrench a limb from a tree to serve them as a club. But we do not know when human beings first began to fashion wood into definite implements by working it with their stone tools. Wood is too perishable a substance to have stood any chance of being preserved from so long distant a past.

Our knowledge of the first employment of wood is indirect. Many of the Mousterian chipped flakes are of such size and shape that they could have been operated much more effectively had they been mounted on a handle. Possibly therefore the process of hafting or handling had come to be practised in the Mousterian, although there is no specific evidence to this effect. In the Upper Palæolithic, wood was certainly used to a considerable extent. The harpoon and dart heads, for instance, must have had wooden shafts.

A true ax is not known from the Old Stone Age and seems to have been invented in the Neolithic. The distinctive factor of the instrument, upon which its utility largely depends, is the straightness and smoothness of the edge; and such an edge is best attained by the grinding process. Even the unground axes of the earliest Neolithic depended on a single stroke to provide them with the required straight cutting edge. We may believe, therefore, that the Palæolithic peoples worked wood in the manner familiar to us from the practices of many modern savage races. They split it, rubbed it, and burned it into shape, rather than trying to chop it.

77. Fire

One of the most fundamental of human arts is the use of fire. It is also one of the most ancient. Its occurrence is easily traced, at any rate in deposits that have not been disturbed by nature, through the presence of charred bones, lumps of charcoal, and layers of ash. Charcoal crumbles easily, but its fragments are practically imperishable. Its presence in considerable quantities in any station, particularly if the coal is accumulated in pockets, is therefore sure proof that the people who occupied the site burned fires for warmth, or cooking, or both purposes. The use of fire has been established throughout the part of the Palæolithic when men lived in caves and under rock shelters; that is, during the Mousterian and Upper Palæolithic.

The Chellean and Acheulean deposits are so much older and more open, and in many cases have been washed over so much by rainfall and by streams, that, if the men of these periods did use fire, as they may well have done, its evidences might have been pretty generally obliterated.

Whether early Palæolithic men knew how to make fire, or whether they only found it and kept it alive, is more difficult to say. They could easily have acquired it in the first place from trees struck by lightning or from other occasional natural agencies. Then, recognizing its value, they may well have nursed it along, lighting one hearth from another. Yet at some time in the Palæolithic the art of producing fire at will, by friction between two pieces of wood, is almost certain to have been invented. One may infer this from the general similarity of level of Magdalenian civilization to that of modern savages, all of whom practise the art of ignition. But in the nature of things it would be difficult to find evidence bearing on this point from more than ten thousand years ago. It can be assumed that man is likely to have lived first for a long period in a condition in which he knew and used and preserved fire, yet was not able to produce it.

78. HOUSES

Although Palæolithic man worked so much in stone, he did not build in it. Hence our knowledge of the kinds of shelters he made for himself is almost *nil.* There are Upper Palæolithic "tectiform" paintings which look as if they might be attempts to depict houses. It is clear, moreover, that in this period the general development of the mechanical arts was sufficiently advanced to allow of the construction of some sort of rude edifices.

It is conceivable that as far back as the Lower Palæolithic simple shelters of branches were constructed, or that skins may have been hung over a few poles to keep off wind and rain. On account of the perishable nature of the materials involved, it happens that there is no proof either for or against such a supposition. It is possible that in time, when patient excavations shall have revealed some particularly well preserved site, the holes may yet be found in which the posts of a Palæolithic hut were once set. In case of a fire, the carbonized stumps might prove to have been preserved in place; or the butts of the posts might have gradually rotted away and the space once occupied by them have become filled with an earthy material of different color and consistency from the surrounding soil. In this lucky event, even the size and shape of the house might be reconstructed from the relative positions of the post holes. From evidence of just this sort some interesting ideas have actually been obtained as to the houses and village plan of Neolithic European peoples. Of course, the chances are much less that remains of this sort would be preserved from the Palæolithic. But the method would be equally applicable if favorable conditions offered; and it is in some such way that we may hope in the future to learn a little about the earliest habitations that mankind constructed. In any event the example serves to illustrate the indirect and delicate means of which the student of prehistory must consistently avail himself in his reconstructions of the past; and gives reason to believe that all that has been learned about early man in the last fifty years is very little in comparison with what the ensuing generation and century will bring to light.

79. Religion

It has already been said that knowledge of religion, a nonmaterial thing, can be preserved from the remote past only by the most roundabout means. It is conceivable that the people of the Upper Palæolithic spent at least as much time in ceremonial observances as in working flint. Analogy with modern uncivilized tribes would make us think that this is quite likely. But the stone tools have remained lying in the earth, while the religious customs went out of use thousands of years ago and the beliefs were forgotten. Yet this is known: As far back as the Mousterian, thirty thousand years ago, certain practices were being observed by the Neandertal race of western Europe which modern savages observe in obedience to the dictates of their religion. When these people of the Mousterian laid away their dead, they put some of their belongings with them. When existing nations do this, it is invariably in connection with a belief in the continued existence of the soul after death. We may reasonably conclude therefore that even in this long distant period human beings had arrived at a crude recognition of the difference between flesh and spirit; in short, religion had come into being. Even to say that Neandertal man did not know whether his dead were dead, implies his recognition of something different from life in the body, for he recognized of course that the body had become different. Whether the Neandertal race already held to the existence of spirits distinct from man or superior to him, it is impossible to say.

The Upper Palæolithic Cro-Magnon peoples laid out the bodies of their dead and sometimes folded them. They also sometimes painted the bodies, and buried flint implements and food in the graves. That is, funerary practices were becoming established. We may assume that hand in hand with this development of observances there went a growth of ritual and belief.

80. Palæolithic Art

The highest achievement of the men of the Old Stone Age is their art. The perfection to which they carried this art is simply astounding in view of the comparative meagerness of their civilization otherwise. It is also remarkable how full-fledged this achievement sprang into existence. The Lower Palæolithic seems to have been without a trace of art. With the Aurignacian, simple carving and painting appear; and while the acme of accomplishment was not reached until the Magdalenian, the essential foundations of a graphic art of high order were laid in the late Aurignacian.

The Upper Palæolithic people carved in ivory, bone, and horn; they incised or engraved on flattened and rounded surfaces of the same material; and they carved and painted the walls of caves. They modeled at times in clay and perhaps in other soft materials, and may have drawn or painted pictures on skins and on exposed rock surfaces, for all we know; we can judge only by the remains that have actually come down to us. This art is not a child-like, struggling attempt to represent objects in the rough, nor is it a mere decorative playing with geometric figures. These first human artists set boldly to work to depict; and while their technique was simple, it was carried to a remarkably high degree of perfection. A few bold strokes gave the outlines of an animal, but they gave it with such fidelity that the species can often be recognized at a glance. The Cro-Magnon people must have developed a high power of mental concentration to be able to observe and reproduce so closely. The most gifted individuals perhaps practised assiduously to attain their facility.

Palæolithic art is very different from that of most modern savages. The latter often work out decorative patterns of some complexity, richness, and æsthetic value, but when they attempt to depict nature, they usually fail conspicuously. The lines are crude and wavering. Any head, body, and tail with four legs stands for almost any animal. It is a reasonable representation of an abstraction that they accomplish, not the delineation of what is characteristic in the visible form. Both observer and painter, among most living savages, are supposed to know beforehand that the drawing represents a fox and not a bear. At most, some symbols are added, such as a bushy tail for a fox or a fin for a whale. It is only in rare cases that any but advanced nations break away from these primitive tendencies and learn to draw things as they really appear. The ancient Egyptians developed such a faculty, and among savages the Bushmen are remarkably gifted, but, on the whole, successful realistic art is an accomplishment of high civilization. It is therefore something of a mystery how the Cro-Magnon men of the Aurignacian brought themselves to do so well.

In sculpture their first efforts were directed upon figurines.

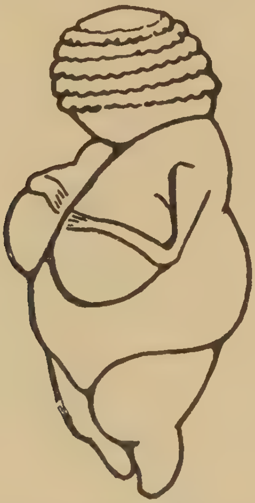

Fig. 20. Limestone statuette from Willendorf, Austria. Characteristic of Aurignacian treatment of the female figure: the face and limbs are abbreviated or only indicated; the parts concerned with reproduction are exaggerated.

These mostly represent the human female. The head, hands, and feet are either absent or much abbreviated. In the body, those parts having to do with reproduction and fecundity are usually heavily exaggerated, but at the same time given with considerable skill (Fig. 20). It is likely that these statuettes served some religious cult. At any rate, the carvings in three dimensions often represent the human figure, whereas two dimensional drawings, etchings, and paintings mostly represent animals and are much more successful than the human outlines. In the Magdalenian, miniature sculpture of animals was added to that of the human figure (Fig. 21).

Success in seizing the salient outline was the earliest characteristic of the paintings and drawings. The first Aurignacian engravings are invariably in profile and usually show only the two legs on the immediately visible side. In time the artists also learned to suggest typical positions and movements—the motion of a reindeer lowering its head to browse, the way an angry bull switches his tail or paws the ground, the curl of the end of an elephant's trunk (Figs. 22, 24). In the Magdalenian, all four legs are usually depicted, and the profile, although remaining most frequent, as it is most characteristic, is no longer the only aspect. There are occasional pictures of animals from before or behind, or of a reindeer with its head turned backward.

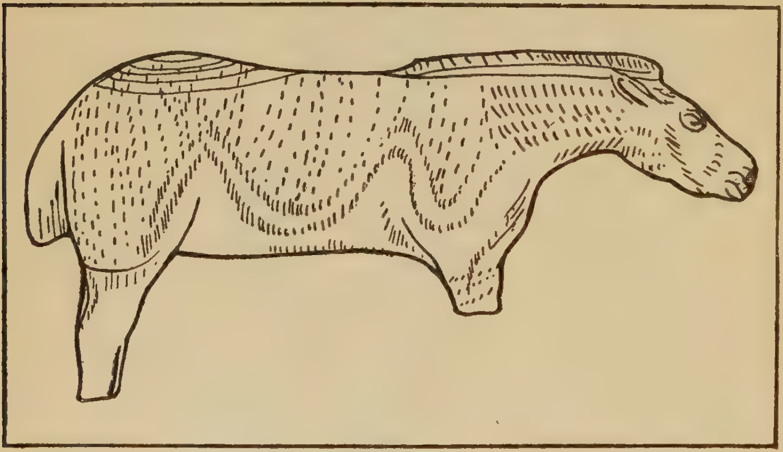

Fig. 21. Horse carved in mammoth ivory. From Lourdes, France. The spirited portrayal of the neck, ears, eyes, and mouth parts is characteristic of Magdalenian sculpture.

There are also some devices which look like the beginnings of attempts at composition. The effect of a row of reindeer is produced by drawing out the first few in some detail, and then suggesting the others by sketching in their horns (Fig. 23). Artists were no longer content, in the Magdalenian, always to do each animal as a solitary, static unit. They were trying, with some measure of success, to represent the animals as they moved in life and perhaps to combine several of them into one coherent picture or to suggest a setting.

By this time they had also acquired considerable ability in handling colors. The Aurignacian and Solutrean artists restricted themselves to monochrome effects. They engraved or painted outlines and sometimes accentuated these by filling them in with pigment. But the best of the later painters in the Magdalenian—those, for instance, who left their frescoes on the walls of the famous cave of Altamira in Spain—used three or four colors at once and blended these into transition tones.

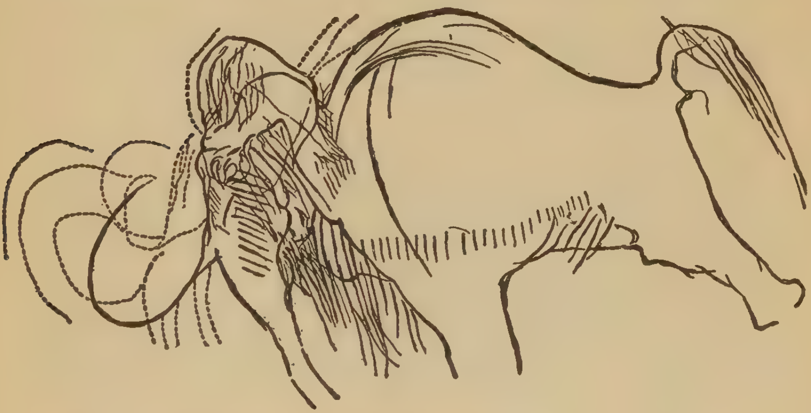

FIG. 22. Engraving of a charging mammoth. On a fragment of ivory tusk found at La Madeleine, France. While the artist's strokes were crude, he was able to depict the animal's action with remarkable vigor. Note the roll of the eye, the flapping ears, the raised tail expressive of anger.

While animals constitute the subjects of probably four-fifths of the specimens of Palæolithic art, and human beings most of the remainder, representations of plants and unrealistic decorative designs are known. The latter seem to have begun to be specially prevalent in the latest Magdalenian, as if in preparation of the conventionalized, non-naturalistic art of the transitional Azilian and Neolithic.

81. Summary of Advance in the Palæolithic

The history of civilization has herewith been outlined from its first dim beginnings to about twelve thousand years ago—say to the neighborhood of 10,000 B.C., as the historian would put it. Progress is immensely slow at the outset, but gradually speeds up. The tabulation in Figure 25 summarizes some of the principal features of this evolution. This diagram does not pretend to be complete; it does try to include some of the most important and representative inventions, arts, and accomplishments of the Old Stone Age.

Thus it appears that the Chellean and Acheulean periods are characterized essentially by a single art, that of chipping implements on a core of flint, plus perhaps the use of fire. The Mousterian evinces progress: stone tools are now made from the flake as well as the core, possibly are sometimes hafted, bone is occasionally utilized, and there are the first indications of budding religion; four or five entries are required to represent these culture traits.

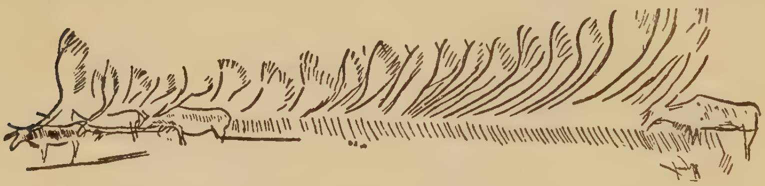

Fig. 23. Magdalenian engraving of a herd of reindeer, found in the grotto of La Mairie, France. The impressionistic manner enabled the artist to suggest rather effectively a large herd while drawing out only four animals.

The greatest advance comes from the Mousterian to the Aurignacian; in other words, between the Lower and the Upper Palæolithic. Three times as many accomplishments are listed as in the Mousterian, and whole series of new inventions are now first met with: body ornaments, bone implements, æsthetic products. This sudden leap in the figures goes far to signalize the importance of the division between the Upper and the Lower Palæolithic. In the Solutrean and Magdalenian still further inventions or refinements appear, until, when the Old Stone Age comes to a close,[1] the stock of human civilization may be described as perhaps twenty times as rich as at the beginning. These figures are not to be taken too literally. The tabulation could easily have been compiled on a more elaborate basis. But even then the relative proportion of culture features in each period would remain approximately as here given. And as regards the general fact of accumulation of civilization, and its range and nature, the diagram may be accepted as substantially representative of what happened.

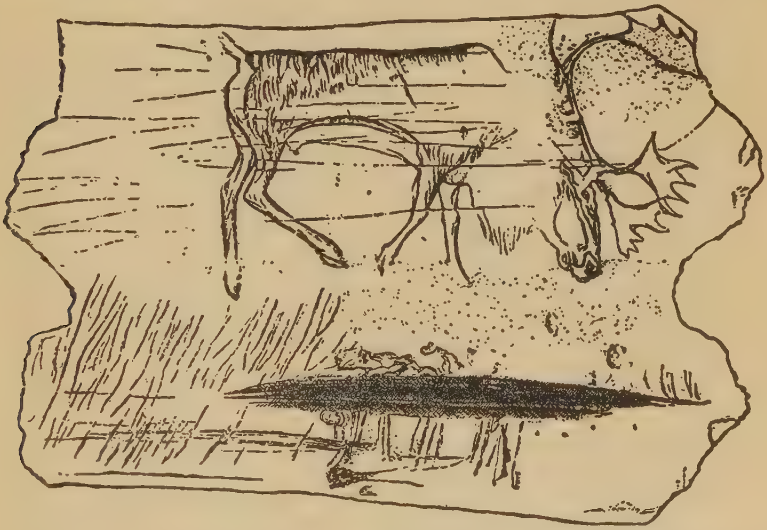

FIG. 24. Magdalenian engraving, perhaps a composition: browsing reindeer among grass, reeds, and water. Note the naturalistic movement suggested by the legs and position of the head. Engraved so as to encircle a piece of antler. Found at Kesslerloch, Switzerland.

The end of the Palæolithic thus sees man in possession of a number of mechanical arts which enable him to produce a considerable variety of tools in several materials: sees him control-

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[1] A period known as the Azilian, dated about 10,000-8,000 B.C., usually included in the Palæolithic, is discussed in chapter XIV in connection with a review of the Palæolithic outside Europe and of the relations between the Palæolithic and Neolithic.

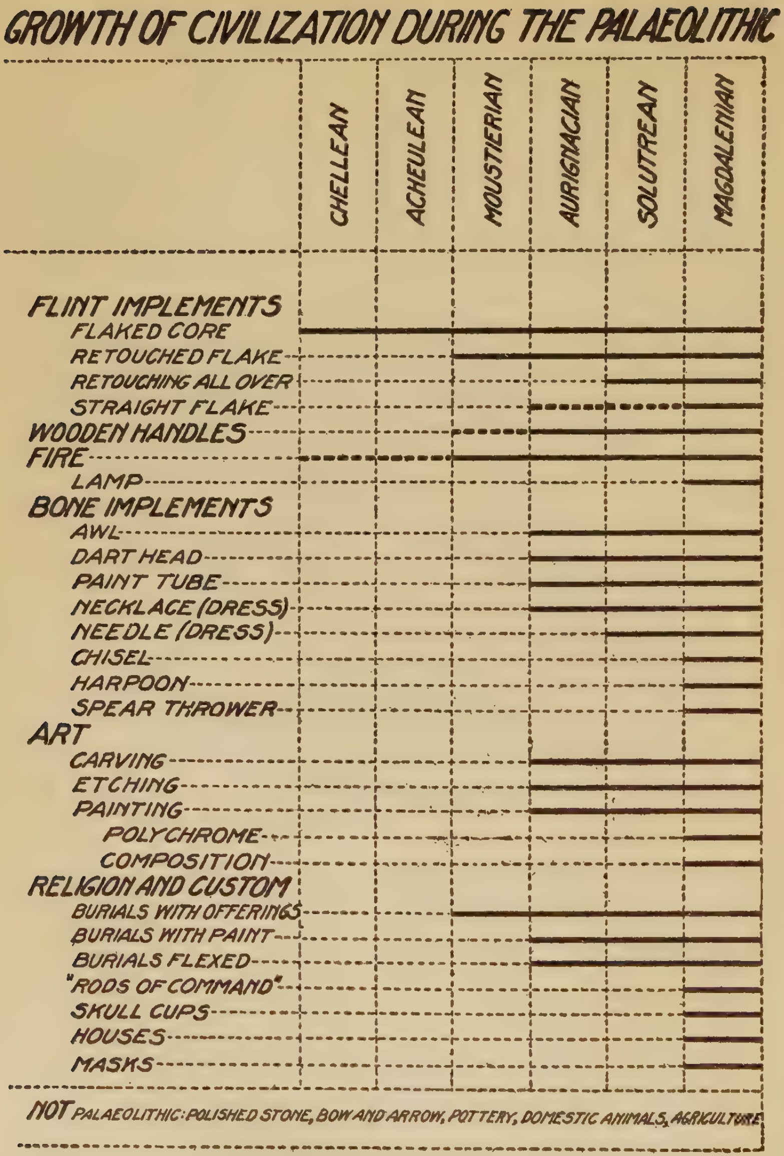

Fig. 25. Growth of civilization during the Palæolithic.

ling fire; cooking food; wearing clothes, and living in definite habitations; probably possessing some sort of social grouping, order, and ideas of law and justice; clearly under the influence of some kind of religion; highly advanced in the plastic arts; and presumably already narrating legends and singing songs. In short, many fundamental elements of civilization were established. It is true that the sum total of knowledge and accomplishments was still pitifully small. The most advanced of the Old Stone Age men perhaps knew and could do about one thing for every hundred that we know and can do. A whole array of fundamental inventions—the bow and arrow, pottery, domestication of animals and plants—had not yet been attempted, and they do not appear on the scene until the Neolithic. But in spite of the enormous gaps remaining to be filled in the Neolithic and in the historic period, it does seem fair to say that many of the outlines of what civilization was ultimately to be had been substantially blocked out during the Upper Palæolithic. Most of the framework was there, even though but a small fraction of its content had yet been entered.

CHAPTER VII

HEREDITY, CLIMATE, AND CIVILIZATION

82. Heredity.—83. Geographical environment.—84. Diet.—85. Agriculture.—86. Cultural factors.—87. Cultural distribution.—88. Historical induction.

82. Heredity

The first of the several factors through which it is logically possible to explain the life and conduct and customs of any people is race or heredity: in other words, the inborn tendencies, bodily and mental, of the people that carry these customs. At first sight it may seem that this element of race might be quite influential. Since peoples differ in inherited characteristics of body—complexion, features, hair, eye color, head form, and the like—these bodily inherited peculiarities ought to be accompanied by mentally inherited traits, such as greater or less inclination to courage, energy, power of abstract thought, mechanical ingenuity, musical or æsthetic proclivities, swift reactions, ability to concentrate, gift of expression. Such racial mental traits, again, might conceivably be expressed in the conduct and culture of each people. Races born to a greater activity of the mechanical faculties would achieve more or higher inventions, those innately gifted in the direction of music would develop more subtly melodious songs, and so on.

Yet in every particular case it is difficult or impossible to establish by incontrovertible evidence that heredity is the specific cause of this accomplishment, of this point of view, or of this mode of life; that it is the determining factor to such and such degree of such and such customs. This is not a denial of the probability that inborn racial differences exist. It is an affirmation of the difficulty, discussed in Chapters I, IV, and V, of knowing what is inborn; and more specifically, of the difficulty of tracing particular customary activities back to particular racial qualities. The problem of connecting specific race traits with specific phenomena of culture or group conduct, such as settled life, architecture in stone, religious symbolism, and the like,—of determining how much of this type of architecture or symbolism is instinctive in the race and how much of it is the result of traditional or social influences,—remains unsolved.

For example, should one try to apply to the explanation of the mode of life or culture of the Indians of the Southwestern United States biological facts, such as their head form, one would be confronted by the difficulty that long heads are characteristic of some of the town-building tribes, or Pueblos, and also of some of the tribes living in brush huts. Broad heads are also found among both the settled and nomadic tribes. The Pueblo Taos and non-Pueblo Pima are narrow-headed, the Pueblo Zuñi and non-Pueblo Apache broad-headed. So with the pulse rate, which has been already mentioned (§ 70) as unusually slow among the Southwestern Indians. It is the same for the nomadic Apache who lived by fighting, and for the Hopi and Zuñi who are famous for their timidity and gentleness. Similar cases might be cited almost endlessly. It is evident that they are of a kind with the lack of correspondence between race and speech, or race and nationality, among the European peoples.

83. Geographical Environment

When it comes to the second factor by which culture might theoretically be explained—physical environment or geography—similar difficulties are encountered.

It is of course plain that a primitive tribe under the equator would never invent the ice box, and that the Eskimo will not keep their food and water in buckets of bamboo, although it is possible that if the Eskimo had had bamboo carried to them by ocean currents, they would have been both glad and able to use it. The materials and opportunities provided by nature may be made use of by each people, while other materials not being provided, other arts or customs can therefore not be developed. But evidently this correspondence is mainly negative. Not performing an act because one lacks the opportunity by no means proves that the opportunity will necessarily lead to the performance. Two nations will live where there is ice to store and one will invent and the other fail to invent the ice chest. Whole series of peoples possess bamboo and clay, and yet some of them draw water in bamboo joints and others in pots. Obviously, natural environment does impose certain *limiting conditions* on human life; but equally obviously, it does not *cause* inventions or institutions.

The native Australians have wood and cord and flint but do not make bows and arrows. Their civilization had not advanced to the point where they were able to devise an efficient bow, and the requisite idea failed to be carried to them from elsewhere as it was to other peoples who also did not invent the weapon. The Polynesians, on the other hand, seem once to have had the weapon, as evidenced by their retaining it as a toy, but to have disused it, perhaps because they specialized on fighting with spears and clubs. Modern civilized people fight at long range, but have let bows go out of use, except for sport, because their knowledge of metallurgy and chemistry centuries ago progressed to the point where they could produce firearms. Development or lack of development or specialization of other cultural activities—social causes—thus determine more directly than other factors whether or not a people employ the bow and arrow. Of those mentioned, the Australians are the only ones with whom a factor of natural environment might be alleged to enter: namely, their isolation, which cut them off from communications and the opportunity to learn from other races. Yet such isolation is as much a matter of inability to traverse space as it is a matter of physical distance. A developed art of navigation would have abolished the Australian isolation. Thus, this seemingly environmental cause of a cultural fact depends for its effectiveness on a co-existing cultural cause. It is the latter which is the most immediate or specific cause.

In general, then, it may be concluded that the directly determining factors of cultural phenomena are not nature which gives or withholds materials, but the general state of knowledge and technology and advancement of the group; in short, historical or cultural influences.

84. Diet

The greater part of the Southwest is arid. Fish are scarce. The result is that most of the tribes get little opportunity to fish. Most of these Southwestern Indians will not eat fish; in fact, think them poisonous. This circumstance might lead to the following inference: nature does not furnish fish in abundance; therefore the Indians got out of the habit of eating them, and finally came to believe them poisonous. At first blush this may seem a sufficient explanation. But it is well to note that the explanation has two parts and that only one of them has to do with nature: the habit of not eating fish because they are too scarce to make it worth while. As soon as one proceeds to the second step, that the disuse led to aversion and then to a false belief of poisonousness, one has gone on to a different matter. Disuse, aversion, and belief lie wholly within the field of human conduct. To derive a psychological phenomenon, such as a belief, from another psychological phenomenon such as a particular disuse, because this disuse is founded on a geographical factor, would of course be a logical fallacy. It can also be shown not to hold, since we prize caviar and oysters and venison in proportion to their rarity. Scarcity in this case thus leads to the contrary psychological attitude, and either fails to establish beliefs or establishes favorable ones.

Again, either through a change in climate or through the improvement of trade, a food that was scarce may become plentiful. Or a people may remove to a new habitat, different from that in which their customs of eating were formed. If environment alone were the dominating cause of their customs, these customs should then immediately alter. As a fact, a group sometimes adheres to its old customs. The immediate cause of such conservatism is habit or inertia or inclination toward superstition or fear of taboo, all of which are mental reactions expressed in folkways or social customs. Thus environment remains at most a partial and indirectly operating cause.

A case in point is that of the Jews. It is often said that the Jew's prohibition against eating pork and oysters and lobsters originated in hygienic considerations; that these were climatically unsafe foods for him in Palestine. This explanation is more simple than true. Ancient Palestine was an arid country in which hogs could not be raised with economic profit, and so they were not raised; and the Philistine and Phœnician kept the Jew from the coast along which he might have obtained shellfish. Eating neither food, he happened to acquire a distrust of them; having the distrust, he rationalized it by saying that it was foreign and wicked and irreligious to act counter to his habits—just like the Pueblo Indian; and in the end had the Lord issue the prohibition for him. Yet this outcome is a long way from the starting point of natural environment. The environment may indeed be said to have furnished the first occasion, but the determining causes of the taboos in the Mosaic law are of an entirely different kind—distrust, custom, rationalization, psychological or cultural factors. If doubt remains, it is dispelled by the orthodox Jew of to-day, whose environment thrusts some of his forbidden foods at him as economically and hygienically satisfactory, whereas he still shudders at the thought of tasting them.

If this sort of cultural crystallizing of custom and subsequent rationalizing or ritual sanctioning takes place among civilized and intelligent people, the like must occur among uncivilized tribes.

85. AGRICULTURE

Attempts have been made to derive the invention of agriculture from climatic factors. The first theory was that farming took its rise in the tropics, where agriculture came naturally, almost without effort, under a bounteous sky. Only after people had acquired the habit of farming and had moved into other less favorably endowed countries, did they take their agriculture seriously in order to survive. But a second, equally plausible, and quite contradictory theory has been advanced, which looks toward the duress rather than the easy favors of nature. On the basis of conditions among the modern Papago Indians and the ancient inhabitants of the Southwest, it has been argued that it must have been the peoples of arid countries who invented agriculture, necessity driving them to it through shortage of wild supplies.

Between such flat opposites, the choice is merely one of unscientific guessing. In this particular case of the Southwest it is certain that both guesses are wrong. Agriculture did not come to the natives of this area because nature was favorable or because it was unfavorable. It came because through increase of knowledge and change of attitude, some people in the region of Southern Mexico or Guatemala or beyond first turned agriculturists, and from them the art was gradually carried, through nation after nation, to the Southwestern tribes, and finally even to the Indians of the North Atlantic coast.

The reasons for acceptance of this explanation are several. First is the distribution of native agriculture, whose practice was about equally spread in the two American continents with its middle in or near Central America. If a geographical diffusion of the art from a center took place, its radiation or extension would probably be about equal to the north and south. Then, the middle portions of the new world held the greatest concentration of native population, such as would have tended to produce a pressure in the direction of the establishment of agriculture and would also normally be a consequence of the continued custom of farming, as opposed to unsettled life. Again, the Southwestern tribes planted only maize, beans, and squashes; the Mexicans grew in addition tomatoes, chili peppers, cacao, and sweet potatoes. It looks as if they had carried their agriculture farther through having been at it longer. Then, pottery has evidently spread out from the same center, and the two arts seem to go hand in hand. Other evidence might be adduced, such as archæological excavations and the botanical fact that the home of the nearest wild relatives of the plants cultivated in the Southwest is the central or middle American area (§ 183).

In short, the Southwestern Indians did not farm because nature induced them to make the invention. They did not make the invention at all. A far away people made it, and from them it was transmitted to the Southwest through a series of successive tribal contacts. These contacts, which then are the specific cause of Southwestern agriculture, constitute a human social factor; a cultural or civilizational factor. Climatic or physical environment did not enter into the matter at all, except to render agriculture somewhat difficult in the arid Southwest, though not difficult enough to prevent it. Had the Southwest been thoroughly desert, agriculture could not have got a foothold there. But this would be only a limiting condition; the active or positive causes that brought about the Southwestern agriculture are its invention farther South, the spread of the invention to the North, and its acceptance there.

Of course this conclusion sheds no light on the causes of the first invention in the middle American region. The ultimate origin of the phenomenon has not been penetrated. But the prevalence of agriculture in the aboriginal Southwest for several thousand years past has been pretty certainly accounted for, and by an explanation in terms of culture or civilization, or the activity of societies of human beings.

86. Cultural Factors

Such cultural causes constitute the third set or kind of factors by which civilization is explainable. If the example just discussed is representative, it is clear that cultural factors ordinarily interpret more phenomena of civilization, and interpret them more fully, than factors either of racial heredity or physical environment.

It is different in zoölogy and botany. The forms and behavior of animals and plants are explainable in terms of heredity and environment because animals and plants have no culture. It is true that the forms and behavior are determined also by other animals and plants, their characteristics, habits, and abundance, but these factors are in a larger sense part of the environment. They are at any rate sub-cultural. But since anthropology deals with beings whose distinctive trait in social relations is the possession of the thing that we call culture, the factors which biology employs are insufficient. It is not that heredity and natural environment fail to apply to man, but that they apply only indirectly and remotely to his civilization. This fundamental fact has often been overlooked, especially in modern times, because the biological sciences having achieved successful increases of knowledge and understanding, the temptation was great to borrow their method outright and apply it without serious modification to the human material of anthropology. This procedure simplified the situation, but yielded inadequate and illusory results. For a very long time the idea that man possessed and animals lacked a soul influenced people's thought to such a degree that they scarcely thought of human beings in terms of biological causality, of heredity and environment. Then when a reaction began to set in, less than two centuries ago, and it became more generally recognized that man was an animal, the pendulum swung to the other extreme and the tendency grew of seeing in him only the animal, the cultureless being, and of either ignoring his culture or thinking that it could be explained away by resolving it into the factors familiar from biology. The just and wise course lies between. The biological aspects of man must be interpreted in terms of biological causation, his cultural aspects in terms first of all of cultural causation. After they have been thus resolved, the cultural causes may reduce to ultimate factors of heredity and natural environment.

87. Cultural Distribution

The Southwest also provides an example of how cultural phenomena can be seen to be arranged geographically so as to yield a meaning or to outline their history, without reference to climate or natural influences. Near the center of the area, in northern New Mexico and Arizona, live four groups of Pueblo or town building Indians—the Hopi, Zuñi, Keres, and Tewa or Tano—who represent a sort of élite of the native culture. They farm, make pottery, accumulate wealth in turquoise, are governed by priests, worship under a remarkably complex set of rituals, which involve altars, masks, symbols of all sorts, and a rude sort of philosophy.

As one goes from the Pueblo center to the less settled tribes, one encounters first the Navaho, who are earth hut builders and farm but little, yet share much of the Pueblo elaborateness of ritual, including altars, masks, and symbols. A little farther out, among the Apache and Pima, the cults have perceptibly diminished in intricacy and symbolic value: altars and masks are lacking.

The simplification increases among the more remote Mohave, whose cults are based on dreams instead of priestly tradition. Still farther, on the shores of the Pacific among the Luiseño and Gabrielino, some Pueblo traits can still be found; cult altars and pottery, for instance. But agriculture, homes of stone, turquoise, priests, and the majority of Pueblo institutions are unknown. Finally, still farther away in central California, the Yokuts now and then show a culture trait reminiscent of the Pueblos: grooved arrow straighteners, perhaps, or occasional rudely made pottery vessels. These are suggestive bits; fragments that have been whittled away or toned down. Pueblo culture as a whole has vanished at this distance. In its place the Yokuts possess quite different arts and institutions and beliefs.

What is the significance of this gradual fading away of one type of civilization and its replacement by others? Evidently that certain influences have radiated out from the higher Pueblo center, and that the effect of these has diminished in proportion to the number of tribes they have passed through. The Pueblos have succeeded in handing over the largest share of their civilization to the adjacent Navaho—and no doubt also received most from them. The Apache being more remote, were less affected; and so on to the farthest limits of the influences.

It is also clear that a time element is involved. A people receiving an art from another obviously acquires this later than the inventors. Most traits which the central Pueblos share with peripheral tribes may be assumed to have existed longer among the Pueblos, simply because they possess more traits in their culture and the flow has prevailingly been out from them. Thus they make uncolored, two-colored, and three-colored pottery; the tribes on the margin of the Southwest, uncolored pottery only; those beyond the range of immediate Southwestern influence, no pottery at all. Unless therefore there should be special reasons suggestive of a degenerative loss of the art among the marginal tribes—and no such reasons are known—the conclusion is forced that Southwestern pottery was first made by the ancestors of the Pueblos or their predecessors in the central part of the area, presumably as plain ware, and that thence knowledge of the art was gradually carried outward.

However while simple pottery making was thus being taken up by the tribes nearest to the Pueblo district, the Pueblos were going ahead and learning to ornament vessels with painted designs. In time this added art also spread to the neighbors, but meanwhile these had passed knowledge of the first stage on to the tribes still farther out than themselves; and meanwhile also the Pueblos had perhaps gone on to a third stage, that of combining colors in their decoration.

In this way, if nothing interrupted the even regularity of the process, the focal people, with their lead in creating or inventing or improving, might pass through half a dozen successive stages of the art, or of many arts, while the outermost peoples were just beginning to receive the rudiments. The intermediate tribes would show attainment of a less or greater number of stages in proportion to their distance from the center. In this event the main facts concerning the pottery art of the Southwest could be represented by a diagram of a step pyramid, each level or step picturing a new increment to the basic art. The Pueblos would be at the peak of the pyramid, five or six steps high, the near-by tribes a step or two lower; and so on to the outermost, who remain at, or have only recently attained to, the first or lowest level; while beyond these would be the non-pottery-making tribes wholly outside the Pueblo sphere of influence.

Of course on the actual map the distribution of the various forms or stages of pottery made does not work out with the perfect regularity of our schematic diagram. Here and there a tribe has migrated from its habitat and disturbed the symmetry of arrangement; or the population of a district has been so thin that it could live on wild products without resorting to agriculture, so that it remained more or less nomadic and had no use for fragile pottery; or a third group of tribes developed basket making to a pitch which yielded excellent vessels, with the result that they were satisfied and failed to take up pottery, or took it up half-heartedly, so that the art remained stunted among them—a stage or two more backward than their position would lead one to expect. But on the whole pottery distribution in the Southwest does follow the schematic arrangement with sufficient closeness to warrant the assumption that the history of its development has been, at least in outline, as just reconstructed.

The facts conform still more closely to the step pyramid arrangement when consideration is given not to pottery alone but to the whole culture—agriculture, other arts, social forms, ritual, religious organization, and the like. In that case Pueblo culture is seen to comprise easily the greatest number of traits or component parts, and these to grow fewer and fewer towards the edges of the Southwest.[1]

88. Historical Induction

The sort of conclusion here outlined is really a historical induction drawn from the facts of culture distribution among living but historyless tribes. Where documents are available, the development, the growth of the pyramid itself, as it were, can often be seen as it happened. Thus, about the year 100 A.D., Rome, Italy, France, England, Scotland, stood on successive descending culture levels related to one another much like Pueblo, Navaho, Pima, Mohave, Gabrielino; and also in the same placement of ever more outward geographic situation.

Where written records fail, archæological remains sometimes take their place. This is true of the Southwest, whose ancient pottery, stone edifices and implements, and evidences of agriculture remain as records of the past, telling a story only a little less complete and direct than that of the Roman historians. One of the archæologists of the Southwest has drawn up a pair of diagrams to outline the culture history of the area as he has reconstructed it from comparison of the prehistoric remains (Fig. 26).

In all this story, what has become of natural environment and heredity? They have dropped from sight. We have been able to build up a reasonable and probably reliable reconstruction

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[1] Of course this does not mean that the tribes beyond the edge are without culture. They would normally be under influences from other centers. And in a certain degree every people possesses initiative and is constantly tending to invent or produce culture, though perhaps only of a simple order. It is only from the point of view of the Southwest and its Pueblo focus that the extra-marginal tribes possess a zero culture.—For examples of other cultural step pyramids, see § 164, 175, Fig. 35.

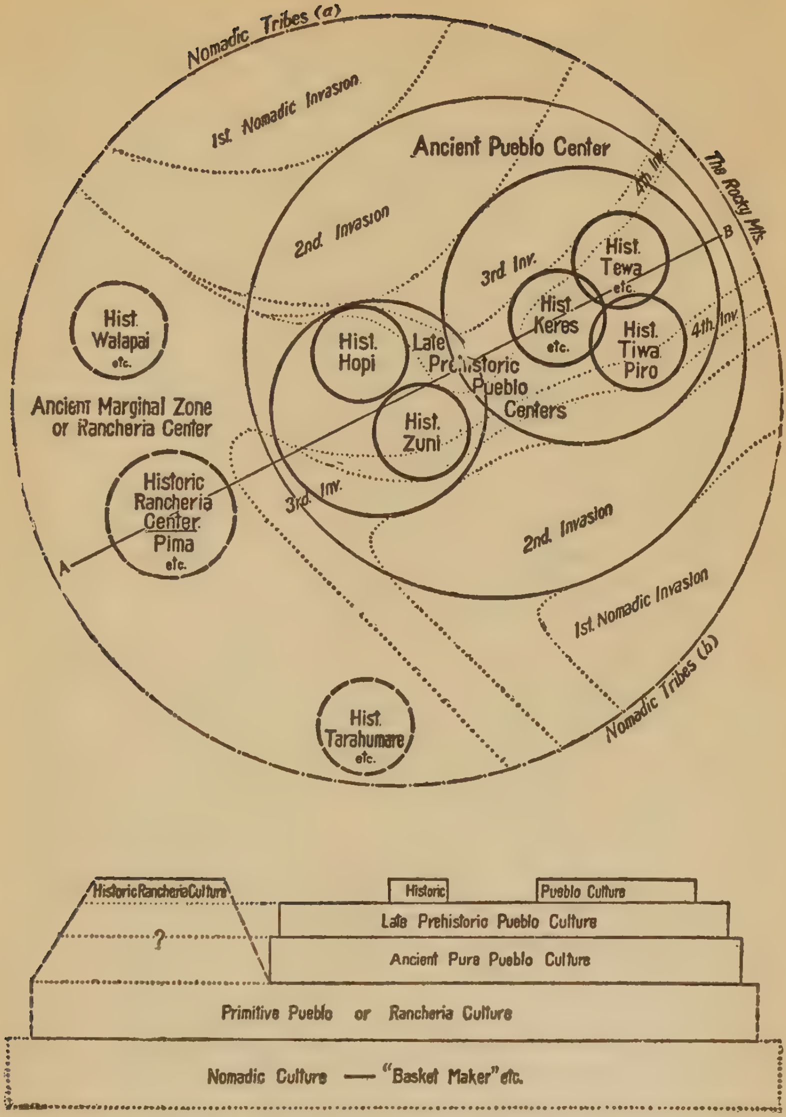

FIG. 26. Diagrammatic representation by Nelson of the geography and history of the culture of the Indians of the southwestern United States: above, in space; below, in time, on *A-B* diameter of circle.

of the course of development of civilization in an area without reference to these two sets of factors. The reconstruction is in terms of culture. Evidently environment and heredity are in the main superfluous. They need not be brought in; are likely to be confusing, to diminish the internal consistency of the findings attained, if they are brought in. This is true in general, not only of the instance chosen. By using environment or heredity, one can often seem to explain certain selected features of a culture, but the appearance is illusory, because one need only be impartial to realize that one can never explain in this way the whole of any culture. When, however, the explanation can be made in terms of culture—always of course on the basis of a sufficient knowledge and digestion of facts—it applies increasingly to the whole of a civilization, and each portion explained helps to explain better all other portions. The cultural interpretation of culture is therefore progressive, and ever more productive, whereas the environmental and the biological-hereditary interpretation fail in proportion as they are pushed farther; in fact can be kept going only by ignoring larger and larger masses of fact to which they do not apply.

Historians, who may be described as anthropologists whose work is made easy for them by the possession of written and dated records, have tacitly recognized this situation. They may now and then attribute some event or condition of civilization to an inherent quality of a race, or to an influence of climate or soil or sea. But this is mostly in their introductory chapters. When they really get to grips with their subject, they explain in terms of human thought and action, in other words, of culture. It is true that they dwell more on personalities than anthropologists do. But that is because the materials left them by former historians are full of personalities and anecdotes. And on the other hand, anthropological data are usually unduly deficient in the personal element; they consist of descriptions of customs, tools used by long forgotten individuals, and the like. If anthropologists were able to recover knowledge of the particular Pueblo woman who first painted a third color or a glaze on a bowl, or of the priest who first instituted a masked dance in order to make rain, we may be confident that they would discuss these individuals. And such knowledge would throw more light on the history of Southwestern pottery and religion and culture generally than any amount of emphasis on the number of inches of rainfall per year, or the pulse rate or similar hypothetical and remote causes.

CHAPTER VIII

DIFFUSION

89. The couvade.—90. Proverbs.—91. Geographic distribution.—92. The magic flight.—93. Flood legends.—94. The double-headed eagle.—95. The Zodiac.—96. Measures.—97. Divination.—98. Tobacco.—99. Migrations.

89. THE COUVADE

The couvade is a custom to which the peasants of the Pyrenees adhered until a century or two ago. When a couple had a child, the wife got up and went about her daily work as well as she might, while the husband went to bed to lie-in in state and receive the visits of the neighbors. This was thought to be for the good of the baby.

The same custom is found among the Indians of Brazil. They believe that a violation of the custom would bring sickness or ill luck upon the child. They look upon the child as something new and delicate, a being requiring not only physical nurture but the superadded protection of this religious or magical practice.

The Basques of the Pyrenees and the Indians of Brazil are of different race, separate origins, and without any known historical contacts. The substantial identity of the custom among them therefore long ago led to its being explained as the result of the cropping out of an instinctive impulse of the human mind. Tylor, for instance, held that whenever a branch of humanity reached a certain hypothetical stage of development, namely, that phase in which the reckoning of descent from the mother began to transform into reckoning of descent from the father, the couvade tended to appear spontaneously as a natural accompaniment. The Basque peasants, of course, are a more advanced people than the cannibalistic Brazilian natives. But they are an old and a conservative people who have long lived in comparative isolation in their mountainous district; and thus, it might be argued, they retained the custom of the couvade as a survival from the earlier transitional condition.

According to this method of explanation, the occurrence of almost any custom, art, or belief among widely separated and unrelated peoples is likely to be the result of the similar working of the human mind under similar conditions. The cause of cultural identities and resemblances, especially among primitive or "nature" peoples, is not to be sought primarily in historical factors, such as common origin, migrations, the propaganda of religion, or the gradual diffusion of an idea, but is to be looked for in something inherent in humanity itself, in inborn psychological tendencies. This explanation is that of "Independent Evolution." It is also known as the doctrine of "Elementary Ideas."

Contrasting with this principle is that of borrowing—one people learning an institution or belief from another, or taking over a custom or invention. That borrowing has been considerably instrumental in shaping the cultures of the more advanced nations, is an obvious fact. People are Christians not through the spontaneous unfolding of the whole dogma and ritual of Christianity in each of them, nor even within their nation, but because of the historically documented spread of Christianity which is still going on. As a heathen people is converted by missionaries to-day, so our North European ancestors were converted by Romans, and the Romans by the Apostles and their followers. When historical records are available, cultural borrowing of this sort is generally easy to establish.

Borrowing can sometimes be shown as very likely even where direct evidence is lacking. If two peoples that possess an institution in common are known off-shoots one from the other, or if they have had numerous trade relations, it is hardly necessary to demonstrate the specific time and manner of transmission between them. Supposing that a religion, an alphabet, and perhaps a number of arts have passed from one nation to another, one would normally ask for little further evidence that a custom, such as the couvade, which they shared, had also been originated by one and borrowed by the other.

90. PROVERBS

Even where contacts are more remote, the geographical setting of two peoples often makes borrowing seem likely. The custom of uttering proverbs, for instance, has a significant distribution. It seems astonishing that barbarous West African tribes should possess a stock of proverbs as abundant and pithy as those current in Europe. Not that the proverbs are identical. The negro lacks too many articles, and too many of our manners, to allude as we do. But he does share with us the habit of expressing himself on certain situations with brief current sayings of homely and instantly intelligible nature, that put a generality into specific and concrete form. Thus: "One tree does not make a forest"; "Run from the sword and hide in the scabbard"; "If the stomach is weak, do not eat cockroaches"; "Distant firewood is good firewood."

The proverb tendency is a sufficiently general one to suggest its independent origin in Africa and Europe. One's first reaction to the parallel is likely to be something like this: The negro and we have formulated proverbs because we are both human beings; the coining of proverbs is instinctive in humanity. So it might be maintained. However, as soon as the distribution of proverbs the world over is reviewed, it becomes evident that their coining cannot be spontaneous, since the native American race appears never to have devised a single true proverb. On the other side are the Europeans, Africans, Asiatics, and Oceanians who are addicted to the custom. Degree of civilization evidently has nothing to do with the matter, because in the Old World primitive and advanced peoples alike use proverbs; whereas in the New World wild hunting tribes as well as the most progressive nations like the Mayas have no proverbs. The only inference which the facts allow is that there must have been a time when proverbs were unknown anywhere —still "uninvented" by mankind. Then, somewhere in the Old World, they came into use. Perhaps it was a genius that struck off the first sayings to be repeated by his associates and then by his more remote environment. At any rate, the custom spread from people to people until it extended over almost all the eastern hemisphere. Some cause, however, such as geographical isolation, prevented the extension of the movement to the western hemisphere. The American Indians therefore remained proverbless because the invention was never transmitted to them. Here, accordingly, is a case of the very incompleteness of a distribution going far to illuminate the history of a culture trait. The lack of parallelism between the hemispheres disproves the explanation by instinctive independent origin. This negative conclusion in turn tends strongly to establish the probability that the custom was borrowed, perhaps from a single source, in the four eastern continents.

91. Geographic Distribution

Thus it appears that it is not always easy to settle the origin and history of the phenomena of culture. Evidently, many facts must be taken into consideration: above all, geographic distribution. Because a habit is so well ingrained in our life as to seem absolutely natural and almost congenital, it does not follow that it really is so. The vast majority of culture elements have been learned by each nation from other peoples, past and present. At the same time there are unexpected limits to the principle of borrowing. Transmission often operates over vast areas and for long periods but at other times ceases.

Two reflections arise. The first is the discouraging but salutary one that the history of civilization and its parts is an intricate matter, not to be validly determined by off-hand guesses. A second conclusion is that the geographic distribution of any culture element is always likely to be a fact of prime importance about it. It is because the Basques and the Brazilian Indians are geographically separate that there is fair prima facie probability of the couvade being the result of independent origin. It is because of another geographic fact, that proverbs are known throughout one hemisphere and lacking from the other, that it must be inferred that they represent a borrowed culture trait.

In the following pages a number of culture elements will be examined from the point of view of their distribution with the aim of determining how far each of the two principles of parallel invention and of borrowing may be inferred to have been operative in regard to them. In place of "independent origin" the terms "parallelism" or "convergence" will be generally used. As an equivalent of "borrowing" the somewhat less metaphorical word "diffusion" will be applied. Well known historic cases of diffusion, such as those of Christianity and Mohammedanism, of Roman law, of the printing press and steam engine and of the great modern mechanical inventions, will not be considered. It is however well to keep these numerous cases in the background of one's mind as a constant suggestion that the principle of diffusion is an extremely powerful one and still active. In fact, the chief reason why early anthropologists did not make more use of this principle seems to have been their extreme familiarity with it. It was going on all about them, so that in dealing with prehistoric times or with remote peoples, they tended to overlook it. This was perhaps a natural error, since the communications of savages and their methods of transmission are so much more restricted than our own. Yet of course even savages shift their habitations and acquire new neighbors. At times they capture women and children from one another. Again they intermarry; and they almost invariably maintain some sort of trade relations with at least some of the adjacent peoples. Slow as diffusion might therefore be among them, it would nevertheless go on, and its lack of rapidity would be compensated by the immense durations of time in the prehistoric period. It is certain that the simpler inventions of primitive man generally did not travel with the rapidity of the printing press and telegraph and camera. But on the other hand, instead of a generation or a century, there would often be periods of a thousand or five thousand years for an invention or a custom to spread from one continent to another. There is thus every a priori reason why diffusion could be expected to have had a very large part in the formation of primitive and barbarous as well as advanced culture.

92. The Magic Flight

There is one folk-lore plot with a distribution that leaves little doubt as to its diffusion from a single source. This is the incident known as the Magic Flight or Obstacle Pursuit. It recounts how the hero, when pursued, throws behind him successively a whetstone, a comb, and a vessel of oil or other liquid. The stone turns into a mountain or precipice; the comb into a forest or thicket; the liquid into a lake or river. Each of these obstacles impedes the pursuer and contributes to the hero's final escape. This incident has been found in stories told by the inhabitants of every continent except South America. Its distribution and probable spread are shown in Fig. 27.

While no two of the tales or myths containing the episode of the Magic Flight are identical, there can be no serious doubt as to a common source of the incident because of the co-existence of the three separate items that make it up. If a people in Asia and one in America each knew a story of a person who to impede a pursuer spilt water on the ground which magically grew into a vast lake, it would be dogmatic to insist on this as proof of a historical connection between the two far separated stories. Belief in the virtue of magic is world-wide, and it is entirely conceivable that from this common soil of magical beliefs the same episode might repeatedly have sprouted quite independently. The same reasoning would apply to the incident of the transformation of the stone and of the comb, as long as they occurred separately. The linking of the three items, however, enormously decreases the possibility of any two peoples having hit upon them separately. It would be stretching coincidence pretty far to believe that each people independently invented the triple complex. It is also significant that the number of impeding obstacles is almost always three. In the region of western Asia and Europe where the tale presumably originated, three is the number most frequently employed in magic, ritual, and folk-lore. Among the American Indians, however, three is scarcely ever thus used, either four or five replacing it according to the custom pattern of the particular tribe. Nevertheless, several American tribes depart from their usual pattern and mention only three obstacles in telling this story.

This instance introduces a consideration that is of growing importance in culture history determinations. If a trait is composed of several elements which stand in no necessary relation to each other, and these several elements recur among distinct or remote peoples in the same combination, whereas on the basis of mere accident it could be expected that the several elements would at times combine and at other times crop out separately, one can be reasonably sure of the real identity and common origin of the complex trait. When a trait is simple, it is more difficult to be positive that the apparent resemblance amounts to identity. Such doubt applies for instance to isolated magical practices. A custom found among separate nations, such as sprinkling water to produce rain, may be the result of an importation of the idea from one people to another. Or again it may represent nothing more than a specific application of the assumed principle that an act similar to a desired effect will produce that effect. This magical belief is so broad, and so ramifying in its exemplifications, as to become almost impossible to use as a criterion. The essential basis of magic may conceivably have been developed at a single culture center in the far distant past and have been disseminated thence over the whole world. Or again, for all that it is possible to prove, magic beliefs may really be rooted instinctively in the human mind and grow thence over and over again with inevitability. There seems no present way of determining which interpretation is correct.

93. Flood Legends

This situation applies to many widely spread concepts in folk-lore. Flood myths of some sort, for instance, are told by probably the majority of human nations. In the early days of the science, this wide distribution of flood myths was held to prove the actuality of a flood, or to be evidence of the descent of all mankind from a single nation which had once really experienced it. Such explanations are too obviously naïve to require refutation to-day. Yet it is difficult to interpret the wide prevalence of flood myths, either as spontaneous growth from out the human mind, or as diffusion from a single devising of the idea. Much of the difficulty is caused by the fact that one cannot be sure that the various flood myths are identical. Some peoples have the flood come after the earth is formed and inhabited, and have it almost destroy the human race. Other nations begin their cosmology with a flood. For them, water was in existence before there was an earth, and the problem for the gods or creative animals was to make the world. This, according to some American Indian versions, they finally accomplished by having one of their number dive to the bottom and bring up a few grains of sand which were then expanded to constitute terra firma. The first type of story is evidently a true ''flood'' myth; the second might better be described as a concept of ''primeval water.'' The difficulty is enhanced by the fact that the two types are sometimes found amalgamated in a single mythology. Thus the Hebrew account begins with the primeval waters but subsequent to the formation of the earth the deluge covers it. So, according to some American tribes, the flood came after the earth, but the waters remained until after the diving. It is clear that flood stories are more shifting than the Magic Flight episode. They may conceivably all be variations of a single theme which has gradually come to differentiate greatly. But again, several distinct concepts—primeval water, flood, the diving animals, the ark—may have been evolved in different parts of the world, each developing in its own way, and traveling so far, in some cases, as to meet and blend with others. This last interpretation is favored by some of the facts of distribution: the prevalence of the diving concept in America,

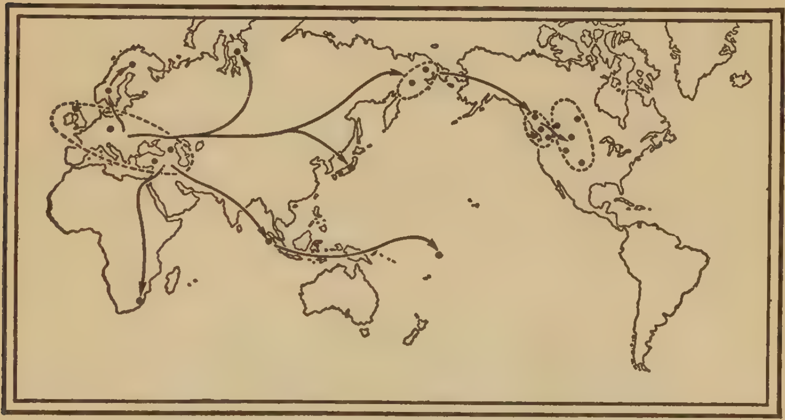

FIG. 27. The Magic Flight tale, an example of inter-continental and inter-hemispheric diffusion. After Stucken, with additions.

for instance, and the absence of flood myths from much of Africa.

There is a vast amount of folk-lore recorded, and much of it has lent itself admirably to the working out of its historical origins, so far as limited regions are concerned. Folk-lorists are often able to prove that one tale originated in India and was carried into mediæval Europe, or that another was probably first devised on the coast of British Columbia and then disseminated across the Rocky mountains to the interior tribes of Indians. When it comes to intercontinental and world-wide distribution, however, difficulties of the sort just set forth in regard to flood myths become stronger and stronger. While the most interesting mythical ideas are those which are world-wide, it is in these that uncertainty between origin by diffusion or parallelism is greatest. The Magic Flight therefore constitutes a grateful exception. It opens the door to a hope that more assiduous analysis and comparison may lead to the accurate determination of the source and history of other common and fundamental myths.

94. The Double-headed Eagle

An unexpected story of wandering attaches to the figure or symbol of the double-headed eagle. Like many other elements of civilization, this goes back to an Egyptian beginning. One of the great gods of Egypt was the sun. The hawk and vulture were also divine animals. A combination was made showing the disk of the sun with a long narrow wing on each side. Or the bird itself was depicted with outstretched wings but its body consisting of the sun disk. These were striking figures of considerable æsthetic and imaginative appeal. From Egypt the design was carried in the second millenium B.C. to the Assyrians of Mesopotamia and to the Hittites of Asia Minor. A second head was added, perhaps to complete the symmetry of the figure. Just as a wing and a foot went out from each side of the body or disk, so now there was a head facing each way. This double-headed bird symbol was carved on cliffs in Asia Minor. Here the pictures remained, no doubt wondered at but uncopied, for two thousand years. In the twelfth and thirteenth centuries after Christ, the Turkish princes, feeling the symbol to be a fit emblem of sovereignty, began stamping it on their coins. The later Crusaders brought these coins, or the idea of the pattern, back with them to Europe, where the mediæval art of heraldry was flourishing. The double-headed eagle was a welcome addition to the lions and griffins with which artists were emblazoning the coats of arms of the feudal nobility. The meaning of sovereignty remaining attached to the figure, the device before long became indicative of the imperial idea. This is the origin of its use as a symbol in the late empires of Austro-Hungary and Russia.

Four hundred years ago Charles V was king of Spain and Austria and Holy Roman emperor of Germany. It was in his reign that Cortez and Pizarro conquered Mexico and Peru. Thus the symbol of the double-headed eagle was carried into the New World and the Indians became conversant with it. Even some of the wilder tribes learned the figure, although they were perhaps more impressed with it as a decorative motive than as an emblem. At any rate, they introduced it into their textiles and embroideries. The Huichol in the remote mountains of Mexico, who use the design thus, seem to believe that their ancestors had always been conversant with the figure. But such a belief of course proves no more than did the ignorance of European heraldists of the fact that their double-headed eagle came to them from Asia Minor and ultimately from Egypt. No pre-Columbian representation of the two-headed eagle is known from Mexico. The conclusion can therefore hardly be escaped that this apparently indigenous textile pattern of the modern Huichol is also to be derived from its far source in ancient Egypt of whose existence they have never heard.

95. The Zodiac

The foregoing example should not establish the impression that the main source of all culture is to be sought in Egypt. Many other ancient and modern countries have made their contribution. It is to the Chinese, for instance, that we owe silk, porcelain, and gun powder. The ancient Sumerians and Babylonians, on the lower course of the Tigris and Euphrates, moved toward definite cultural progress about as early as the Egyptians, and have perhaps contributed as many elements to the civilization of to-day.

One of these is the zodiac. This is the concept of dividing the path of the sun, moon, and planets around the heavens into twelve equal parts, each named after a constellation. The series runs: ram, bull, twins, crab, lion, virgin, scales, scorpion, archer, goat, water-carrier, fishes. Constellations, indeed, had begun to be named at a very early time, as is clear from the practice being common to all mankind. But the specific arrangement of these twelve constellations as a measure of the movement of the heavenly bodies seems to have made its first appearance among the Chaldean Babylonians about a thousand years before Christ. From them the Persians, and then the Greeks, learned the zodiac; and with its introduction to the Roman Empire it became part of the fund of knowledge common to the whole of western civilization. It does not appear to have been accepted by the Egyptians until Roman imperial times. Knowledge of the zodiac also spread eastward to India. It seems to have been carried as far as China by Buddhist missionaries, but failed to be seriously adopted in that country until its reintroduction by Jesuit missionaries in the seventeenth century.

The Chinese long before had invented a series of twelve signs which has sometimes been called a zodiac, and gradually transmitted it to the adjacent natives of Japan, Korea, Mongolia, Turkistan, and Tibet. This seems to be of independent origin from the western or Babylonian zodiac. It appears to have been devised to designate the hours, then applied to other periods of time, and finally to the heavens. Its path through the sky is the reverse of the western zodiac; and its signs are specifically different: rat, ox, tiger, hare, dragon, serpent, horse, sheep, monkey, hen, dog, and pig. At most, therefore, it would seem that there might have penetrated to China from the west the idea of dividing time or space into twelve units and assigning to each of these the name of an animal. The working out and utilization of the idea were native Chinese.

Already in ancient times the pictures of the twelve constellations of the western zodiac began to be abbreviated and reduced to symbols. These gradually become more and more conventional, although evidences of their origin are still visible. The sign of the ram, for instance, as we employ it in almanacs, shows the downward curling horns of this animal; that for the ox, his rising horns; for the archer, his arrow, and so on. These cursive symbols, once they became fixed, underwent some travels of their own which carried them to unexpected places. The Negroes of the west coast of Africa make gold finger rings ornamented with the twelve zodiacal symbols in their proper sequence. They seem ignorant of the meaning, in fact do not possess sufficient astronomical knowledge to be able to understand the use of the signs. It also remains uncertain whether they learned the set of symbols from European navigators or from the Arabs that have penetrated the northern half of Africa. Nevertheless it is the true zodiac which they portray, even though only as a decorative pattern.

There has been some assertion that the zodiac was known to the more advanced Middle American Indians between Arizona and Peru, but the claim has also been denied. There does appear to have been at least one series of animal signs used by the Mayas of Yucatan in an astronomical connection. It is not known that this series served the true zodiacal function of noting the positions of the heavenly bodies. Further, the Maya series consists of thirteen instead of twelve symbols, and the figures present only distant resemblances to the Old World zodiac. There is only one that is the same as in the Old World zodiac: the scorpion. The relationship of the Maya and Old World series is therefore unproved, and probably fictitious. The case however possesses theoretical interest in that it illustrates the criteria of the determination of culture relationships.

The Mexican zodiac would unquestionably be interpreted as a derivative from the Asiatic one, even though its symbols departed somewhat from those of the latter, provided that the similar symbols came in the same order. The Asiatic ram might well be replaced by a Mexican deer, the lion by a wildcat, and the virgin by a maize goddess. And if the deer, the wildcat, and the maize goddess came in first, fifth, and sixth place, it would be almost compulsory to look upon them as superficially altered equivalents of the Old World ram, lion, and virgin. It is conceivable enough that similar individual symbols might independently come into use in remote parts of the world. But it is practically impossible that a series of symbols should be put into the same arbitrary sequence independently. As a mere matter of mathematical probability there would be no more than an infinitesimal chance of such a complex coincidence. If therefore the sequential identity of the American series and the Old World zodiac should ever be proved,[1] it would be necessary to believe that this culture element was somehow carried into the Middle American regions from Asia, either across northern America or across the Pacific.

Identity of sequence failing, there might still remain an instance of partial convergence. It is within the range of possibility that the Mayas, who were painstaking astronomers and calculators, and who like ourselves named the stars and constellations after animals, arranged a series of these as a mnemonic or figurative aid in their calendrical reckoning. This, however, would be a case of only incomplete parallelism. The general concept would in that event have been developed independently, its specific working out remaining distinctive.

On accurate analysis of culture phenomena, this sort of result proves to be fairly frequent. When independent developments have occurred, there is a basic or psychological similarity, but concrete details are markedly different. On the other hand if a differentiation from a common source has taken place, so that true historical connection exists, some specific identity of detail almost always remains as evidence. It therefore follows that if only it is possible to get the facts fully enough, there is no theoretical reason why ultimately all cultural phenomena that are still hovering doubtfully between the parallelistic and the diffusionary interpretations should not be positively explainable one way or the other. This of course is not an assertion that such proof has been brought. In fact there are far more traits of civilization whose history remains to be elucidated than have yet been solved. But the attainments already achieved, and an understanding of the principles by which they have been made, encourage hope for an indefinite increase of knowledge regarding the origin and growth of the whole of human culture.

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[1] It has not been. The Maya series runs: 1 not made out, 2 rattlesnake, 3 tortoise, 4 scorpion, 5 king vulture, 6 marine monster, 7 bird, 8 frog (?), 9 deer (?), 10 and 11 not made out, 12 death, 13 peccary. Comparison with the Old World list shows 8-scorpion and 4-scorpion, and 1-ram and 9-deer (?), as the only resemblances.

96. Measures

Another increment of civilization due to the Babylonians is a series of metric standardizations. These include the division of the circle into three hundred and sixty degrees, of the day into twenty-four (originally twelve) hours, of the hour into sixty minutes, of the foot into twelve inches, and the pound—as it survives in our troy weight—into twelve ounces. It is apparent that the system involved in these measures is based on the number twelve and its multiple sixty. The weights current in the ancient Near East also increased by sixties. On these weights were based the ancient money values. The Greek mina, Hebrew maneh, approximately a pound, comprised sixty shekels (or a hundred Athenian drachmas), and sixty minas made a talent. A talent of silver and one of gold possessed different values, but the weight was the same. This system the Greeks derived from Asia Minor and Phœnicia. Their borrowing of the names, as well as the close correspondence of the actual weight of the units, evidences their origin in Babylonia or adjacent Aramæa.

The duodecimal method of reckoning was carried west, became deeply ingrained during the Roman Empire, and has carried down through the Middle Ages to modern times. It would be going too far to say that every division of units of measure into twelve parts can be traced directly to Babylonia. Now and then new standards were arbitrarily fixed and new names given them. But even when this occurred, the old habit of reckoning by twelves for which the Babylonians were responsible, was likely to reassert itself in competition with the decimal system. Modern coinage systems have become prevailingly decimal, but it is only a short time ago that in south Germany 60 kreuzer still made a gulden; and the twelve pence of the English shilling obviously suggest themselves.

Certain of these metric units became fixed more than two thousand years ago and have descended to us by an unbroken tradition. The Babylonian degrees, minutes, and seconds, for instance, became an integral part of the ancient astronomy, were taken up by the Greeks, incorporated by them in their development of the system of astronomy known as the Ptolemaic, and thus became a part of Roman, Arab, and mediæval European science. When a few centuries ago, beginning with the introduction of the Copernican point of view, astronomy launched forward into a new period of progress, the old system of reckoning was so deeply rooted that it was continued without protest. Had the first truly scientific beginnings of astronomy taken place as late as those of chemistry, it is extremely doubtful whether we should now be reckoning 360 degrees in the circumference of the circle. The decimal system would almost certainly have been applied.

The last few examples may give the impression that cultural diffusion takes place largely in regard to names and numbers. They may arouse the suspicion that the intrinsic elements of inventions and accomplishments are less readily spread. This is not the case. In fact it has happened time and again in the history of civilization that the substance of an art or a knowledge has passed from one people to another, while an entirely new designation for the acquisition has been coined by the receiving people. The English names of the seven days of the week (§ 125) are a case in point. If stress seems to have been laid here on names and numbers, it is not because they are more inclined to diffusion, or most important, but because their diffusion is more easily traced. They often provide an infallible index of historical connection when a deficiency of historical records would make it difficult, perhaps impossible, to prove that the common possession of the thing itself went back to a single source. If historical records are silent, as they are only too often, on the origin of a device among a people, the occurrence of the same device at an earlier time among another people may strongly suggest that it was transmitted from these. But the indication is far from constituting a proof because of the theoretical possibility that the later nation might have made the invention independently. It is chiefly when the device is complex and the relation of its parts identical that the probability of diffusion approaches surety. If however not only the thing but its name also are shared by distinct nations, doubt is removed. It is obvious that peoples speaking unrelated languages will not coincide one time in a thousand in using the same name for the same idea independently of each other. The play of accident is thus precluded in such cases and a connection by transmission is established. In fact the name is the better touchstone. An invention may be borrowed and be given a home-made name. But a foreign name would scarcely be adopted without the object being also accepted.

97. Divination

One other Babylonian invention may be cited on account of its curious history. This is the pseudo-science of predicting the outcome of events by examination of the liver of animals sacrificed to the gods. A system of such divination, known as hepatoscopy, was worked out by the Babylonian priests perhaps by 2,000 B.C. Their rules are known from the discovery of ancient clay models of the liver with its several lobes, each part being inscribed with its significance according as it might bear such and such appearance. In some way which is not yet wholly understood, this system was carried, like the true arch, from the Babylonians to the Etruscans. As there are definite ancient traditions which brought the Etruscans into Italy from Asia, the gap is however lessened. The Etruscans, who were evidently addicted to priestly magic, carried on this liver divination alongside another method, that of haruspicy or foretelling from the flight or actions of birds. Both systems were learned from them by the Romans, according to Roman tradition itself.

With the spread of Christianity, hepatoscopy and haruspicy died out in the west. But meanwhile they had been carried in the opposite direction from their Babylonian source of origin, and became established in eastern Asia and finally, in somewhat modified form, among remote uncivilized peoples. The pagan priests of Borneo and the Philippines even to-day are foretelling the future by observing the flight of birds and examining the gall bladder—an organ intimately associated with the liver—of sacrificial animals. If these primitive Malaysian peoples had always remained uninfluenced by higher cultures, their divinatory customs might be imputed to independent invention. They live, however, at no great distance from the Asiatic mainland, and are known to have been subjected to heavy cultural influences from China, Arabia, and especially India. Four centuries ago, to cite only a few specific instances, the Philippine chieftains went under the title of rajah, the Hindu word for king. In the southern Philippine islands there are "sultans" to-day. In all parts of the Philippines as well as Borneo, even among the rude tribes of the interior mountains, Chinese jars imported centuries ago are treasured as precious heirlooms. With these streams of higher culture flowing into the Malaysian islands, the only reasonable conclusion is that the arts of liver and bird divination were also imported. In fact, it seems probable that the broader custom of sacrificing animals to the gods and spirits, a custom to which the pagan Malaysians still adhere, is a part of the same wave of influence from the Orient which has so deeply stamped the Homeric poems and the Old Testament. Although theoretically it is not surprising that hepatoscopy and haruspicy still flourish among some backward and marginally situated peoples, yet, in the concrete and at first blush, it is striking to find that an institution which was active in Babylonia three or four thousand years ago should still maintain an unbroken life in Borneo. Evidently the diffusion principle reaches far and long.

Another method of foretelling, which has spread equally far, although its flow has been mainly from the east westward, is scapulimancy, divination from the cracks that develop in scorched shoulder blades. This seems to have originated in ancient China with the heating of tortoise shells; had spread by the third century after Christ to Japan, where deer shoulder blades were employed; and is found to-day among the Koryak and Chukchi of northeasternmost Siberia, who utilize the same bones from seals and reindeer respectively. Elsewhere domestic animals, above all the sheep, furnish the proper shoulder blade. All the central Asiatic nations as far south as the Tibetans and Lolos are addicted to the custom, which had official status with the Mongol rulers in the thirteenth century, but must have been older, since it was in vogue among the Byzantine Greeks two hundred years earlier. The practice spread over practically all Europe, where it flourished in the fifteenth and sixteenth centuries and still lingers among belated rural populations; to Morocco and perhaps other parts of north Africa; and in Asia to South Arabia, Afghanistan, and westernmost India. Scapulimancy was not known to the ancient Babylonians, Egyptians, Hebrews, Greeks, Etruscans, and Romans; it seems not to have penetrated far into India and not at all into the countries and islands to the east of India, which are sheepless regions; and it did not obtain a foothold in North America, where sheep and other tame animals were also not kept. It appears therefore that the custom, after a period of somewhat wavering formation in eastern Asia, crystallized into an association with the domesticated sheep, forming a true culture ''complex,'' and was then diffused almost as far as this animal.

98. Tobacco

The speed with which inventions sometimes diffuse over large areas is in marked contrast to the slowness with which they travel on other occasions. The art or habit of smoking originated in tropical America where the tobacco plant is indigenous. From this middle region the custom spread, like agriculture, pottery, and weaving, in both directions over most of north and south America. Originally, it would seem, a tobacco leaf was either rolled on itself to form a rude cigar, or was stuffed, cigarette fashion, into a reed or piece of cane. Columbus found the West Indians puffing at cigars. In the Southwestern United States, the natives smoked from hollow reeds. Farther into the United States, both to the east and west, the reed had become a manufactured tube of wood or stone or pottery. This tubular pipe, something like a magnified cigarette holder, has the bowl enlarged at one end to receive the tobacco. It has to be held more or less vertically. This form has survived to the present day among the California Indians. As the tubular pipe spread into the central and eastern United States, it was elaborated. The bowl was made to rise from the top of the pipe, instead of merely forming its end. This proved a convenience, for the pipe had now no longer to be pointed skyward to be smoked. Here then was a pipe with a definite bowl; but its derivation from the straight tubular pipe is shown by the fact that the bowl was most frequently set not at the end of the stem, as we "automatically" think a pipe should be, but near its middle. The bowl evidently represented a secondary addition which there seemed no more reason to place at the end than in the middle of the pipe; and the latter happened to become the fashion.

All this evolution took place at least a thousand years ago, probably much longer. Elaborate stone pipes have been discovered in the earthworks left by the Mound Builders of the Ohio Valley, a people whose very existence had been forgotten when the whites first came. Californian stone pipes occur well down toward the bottom of shell mounds estimated to have required three or four thousand years to accumulate.

Here and there this slow diffusion suffered checks. In the Andean region of South America tobacco came into competition with coca, a plant whose leaf was chewed. The effect of the contained alkaloid is to prevent fatigue and hunger. Of the two, coca triumphed over tobacco, possibly because its action is more drug-like. In North America, on the other hand, tribes that had not adopted maize and bean agriculture, sometimes tilled tobacco patches. With them, tobacco cultivation had outstripped the spread of so important an institution as food agriculture. In the extreme parts of North America, climatic factors checked the growth of tobacco, either wild or cultivated. Where the supply was scarce, it was either diluted with pulverized tree bark, as by many tribes of the central United States, or it was eaten, as by a number of groups on the Pacific coast. To these latter, tobacco seemed too precious to set fire to and lightly puff away. They mixed it with lime from burnt shells and swallowed it. Taken in this form, a small quantity produces a powerful effect. In the farthest north of the continent, even this device had not obtained a foothold. The development of intertribal trade was too slender and intermittent for anything but valuables, let alone an article of daily consumption, to be transported over long distances. The result was that the Eskimo, when first discovered, knew nothing of tobacco or pipes.

The use of tobacco was quickly carried to the Old World by the Spaniards, and before long all Europe was smoking. Throughout that continent, irrespective of language, the plant is known by modifications of the Spanish name *tabaco,* which in turn seems based on a native American name for cigar. By the Spaniards and Portuguese, and later also by the Arabs, the habit of smoking was carried to various points on the shores of Africa, Asia, and the East Indies. Thence it spread inland. Native African tribes, and others in New Guinea, who had never seen a white man, have been found not only growing and smoking tobacco, but firmly believing that their ancestors from time immemorial had done so. This is a characteristic illustration of the short-livedness of group memory and the unreliability of oral tradition.

In northeastern Siberia, where the Russians introduced tobacco, a special form of pipe came into use. It has a narrow bowl flaring at the top. Seen from above, this bowl looks like a disk with a rather small hole in the center. In profile it is almost like a capital T. It is set on the end of the pipe-stem. This stem may be straight or flattened and curved. This form of pipe, along with tobacco as a trade article, crossed Behring Strait and was taken up by the Alaska Eskimo. That this pipe is not of Eskimo origin is shown by its close resemblance to the Chukchi pipe of Siberia. The fact that it is impossible for the Eskimo to grow tobacco corroborates the late introduction, as does the Alaska Eskimo name: tawak. In short, smoking reached the Eskimo only after having made the round of the globe. Originating in Middle America, the custom spread very anciently to its farthest native limits without being able to penetrate to the Eskimo. As soon as the Spaniards appeared on the scene, the custom started on a fresh career of travel and rolled rapidly eastward about the globe until it reëntered America in the hitherto non-smoking region of Alaska.

A second invasion of America by a non-American form of pipe occurred in the eastern United States. The old pipe of this region, as already stated, had its bowl set well back from the end of the stem. The whole object thus had nearly the shape of an inverted capital T, whereas the European pipe might be compared to an L laid on its back. After the English settlers had become established on the Atlantic coast, a tomahawk pipe was introduced by them for trade purposes. This was a metal hatchet with the butt of the blade hollowed out into a bowl which connected with a bore running through the handle. One end of the blade served to chop, the other to smoke. The hatchet handle was also the pipe stem. The combination implement could be used as a weapon in war and as a symbol of peace in council. This doubleness of purpose caused it to appeal to the Indian. The heads of these iron tomahawk pipes were made in England for the Indian trade. They became so popular that those natives who were out of reach of established traders, or who were too poor to buy the metal hatchet-pipes, began to imitate them in the stone which their forefathers had used. In the Missouri valley, a generation ago, among tribes like the Sioux and the Blackfeet, imitation tomahawk pipes, which would never have withstood usage as hatchets, were being made of red catlinite together with the standard, native, inverted-T pipes. One of the two coexisting forms represented a form indigenous to the region since a thousand years or more, the other an innovation developed in Europe as the result of the discovery of America and then reintroduced among the aborigines. Diffusion sometimes follows unexpectedly winding routes.

99. Migrations

It may seem strange that with all the reference to diffusion in the foregoing pages, there has been so little mention of migration. The reason is that migrations of peoples are a special and not the normal means of culture spread. They form the crass instances of the process, easily conceived by a simple mind. That a custom travels as a people travels with it, is something that a child can understand. The danger is in stopping thought there and invoking a national migration for every important culture diffusion, whereas it is plain that most culture changes have occurred through subtler and more gradual operations. The Mongols overran vast areas of Asia and Europe without seriously modifying the civilization of those tracts. The accretions that most influenced them, such as writing and Buddhism, came to them by the quieter and more pervasive process of peaceful penetration, in which but few individuals were active. We are all aware that printing and the steam engine, the doctrine of evolution and the habit of riming verses, have spread through western civilization without conquests or migrations, and that each year's fashions flow out from Paris in the same way. When however it is a question of something remote, like the origin of Chinese civilization, it is only necessary for it to be pointed out that the early forms of Chinese culture bear certain resemblances to the early culture of Mesopotamia, and we are sure to have some one producing a theory that marches the Chinese out of the west with their culture packed away in little bundles on their backs. That is far more picturesque, of course, more appealing to the emotions, than to conceive of a slow, gradual transfusion stretching over a thousand years. In proportion as the known facts are few, imagination soars unchecked. It is not because migrations of large bodies of men are rare or wholly negligible in their influence on civilization that they have been touched so lightly here, but because we all tend, through the romantic and sensationalistic streak in us, to think more largely in terms of them than the sober truth warrants. It is in culture-history as in geology: the occasional eruptions, quakings, and other cataclysms stir the mind, but the work of change is mainly accomplished by quieter processes, going on unceasingly, and often almost imperceptible until their results accumulate.

CHAPTER IX

PARALLELS

100. General observations.—101. Cultural context.—102. Universal elements.—103. Secondary parallelism in the Indo-European languages.—104. Textile patterns and processes.—105. Primary parallelism: the beginnings of writing.—106. Time reckoning.—107. Scale and pitch of Pan's pipes.—108. Bronze.—109. Zero.—110. Exogamic institutions.—111. Parallels and psychology.—112. Limitations on the parallelistic principle.

100. General Observations

The principle of truly independent or convergent invention is more difficult to establish by positive examples than imitative diffusion. It has often been assumed as operative, more rarely proved; and even in the latter cases has perhaps never been found to lead to complete identity.

In fact, the first observation to be made is that resemblance must not be too close if independent development is to be the explanation. A complex device used in two or more parts of the world suggests a connection between them in very proportion to its complexity. A combination of two or even three elements might conceivably have been repeated independently. A combination of five or ten parts serving an identical purpose in an identical manner must necessarily appeal as impossible of having been hit upon more than once. One thinks almost under compulsion, in such a case, of historical connection, of a transference of the idea or machine from one people to the other.

If the resemblance includes any inessential or arbitrary parts, such as an ornament, a proportion that so far as utility is concerned might be considerably varied but is not, a randomly chosen number, or a name, the possibility of independent development is wholly ruled out. Such extrinsic features would not recur together once in a million times. Their association forces a presumption of common origin, even though it be difficult to account for the historical connection involved. The significance of names in this situation has already been commented on.

There is nothing arbitrary about this limitation on the parallelistic principle. We all apply similar checks in practical life. If in a court of law several witnesses testify to the same facts in the same language, without one of them adding or diminishing an item, if they follow the identical order of events, if even details such as the precise minute of an occurrence are stated without variation, judge and jury will infallibly suspect that the several testimonies go back to a single source of inspiration. Eyewitnesses will differ. They have seen from different angles; have followed events with attention that varied according to their participation and their previous habits and training; have reacted with individually colored emotion. So with nations. Their customs, interests, faculties are never wholly alike. Their independent inventions and innovations, always springing out of a distinctive soil, therefore necessarily take on a distinctive aspect even when they embody the same idea. In the degree that the form as well as the substance of culture traits coincide, does the probability of independent evolution diminish in favor of some sort of connection.

101. Cultural Context

The presence or absence of other connections is also a factor of greatest importance In other words, no fact relating to human civilization may be judged wholly without reference to its context or background. If there are known connections, either in space or in time, between two nations, the likelihood of their having separately evolved a common trait is much less than as between two peoples in different continents or separated by thousands of years. It is not known precisely how knowledge of the true arch and of liver divination were carried from ancient western Asia to the Etruscans of Italy. Yet the fact that Babylonia and Etruria shared two such specific culture traits as these, greatly increases the probability for each one having been borrowed from the Asiatic by the European people. When the consideration is added that the ancients had traditions of the Etruscans having come to Italy out of Asia Minor, the likelihood of diffusion is strengthened to the point of practical certainty.

Connection in space is a particularly cogent argument in favor of diffusion, because of its powerful presumption of accompanying communication. When several hundred Indian tribes without a break in their ranks between Quebec and Argentina cultivate maize, it would be absurd to dream of each of them having originated the domestication of the plant for itself. To be sure, it is logically conceivable that maize agriculture was independently developed by two or three of the most advanced tribes of the hundreds and then became diffused until the two or three areas of dispersion met and coalesced into one greater area. Yet the principle that economy of explanation is the best would militate even against this interpretation as compared with diffusion from a single center, unless there were definite indications in favor of the multiple origin explanation. Such indications might be radically distinct types of the plant or of agricultural implements in several parts of the maize area.

So, when the tribes on the Alaskan and Siberian sides of Behring Sea relate similar Raven legends, the geographical proximity is so close that it would be pedantic to let the fact that two continents are involved stand in the way of an explanation by diffusion. Even where the distribution of a trait penetrates much farther into both America and Asia, as is true of the composite bow (§ 210), the continuity of area leaves little doubt as to diffusion from a single center, especially since it is reinforced by other traits showing the same intercontinental distribution: the Magic Flight story, for instance. It is only when the areas are discrete as well as remote, when other similarities between them are few or absent, when their cultural backgrounds are radically dissimilar, as in the case of the couvade, that parallelism begins to knock at the door of interpretation with serious hope of admittance.

102. UNIVERSAL ELEMENTS

When a culture trait is very ancient and of practically worldwide occurrence, it becomes difficult to estimate between diffusion and independent invention. The fire-drill, flint chipping, the bow and arrow, the doctrine of animism or belief in souls and spirits, sympathetic magic, are in this class. The very universality of these elements tends to obliterate tangible evidence as to their histories. A generation or two ago it was generally taken for granted that such devices and beliefs as these sprang more or less spontaneously out of the human mind as soon as man had traversed a certain short distance of the evolutionary road that led him away from the brutes. At present, anthropological opinion is more cautious about such assumptions. It is perhaps spontaneous enough for people in the habit of using tools to try to fashion them from stone if other materials be lacking, and easy for a nation accustomed to projectile weapons to invent the bow without ever having learned of it. But this is far from proving what a people without these habits might do. Intelligent as an ape is, and gifted with manual dexterity, it rarely enters his mind to throw a stone as a missile and never to split it into a knife or weapon. For all we know, it may have cost our ancestors untold mental energy to bring themselves to the point of fashioning their first stone implements; so much, indeed, that it is possible all of them did without until one more gifted or fortunate group made the difficult invention which was then imitated by the others. It is temptingly but fatally easy to project our habits of mind into primitive man—much easier to imagine ourselves in his position than to imagine him, without reference to ourselves, as he was. Animal psychologists have learned not to anthropomorphize, that is, endow the lower animals with specifically human mind processes. Anthropologists have learned to guard against the similar pitfall of interpreting low cultures by the standards of our own, of assuming that because a thing seems "natural" to us it must have seemed natural and therefore have been done by any savage. It is clear that what did not happen was for every tribe or race to originate for itself its fire-making, flint-chipping, bows, animism, and magic. It is conceivable that each of these culture products traces back to a single source in human history. There are authorities who have held this very opinion; some expressedly, others by implication. It is not necessary to go so far; in fact, wiser not to, because none of these matters is yet susceptible of real proof. But it does seem profitable to recognize the possibility of the truth of such views, and that the drift of accumulating knowledge and experienced interpretation is in their direction.

A simple consideration which has too often been neglected is that diffusion and imitation undisputedly do take place in culture on a vast scale. So far as independent developments occur, be that rarely or frequently, they are therefore sure to be more or less intertwined with disseminations. Even one particular device may be partly borrowed and partly modified or further developed by original effort. Still more intimate must be the combination of native and diffused elements in the whole culture of any people. To wage an abstract battle as between two opposite principles is sterile, when their manifestations are admittedly frequent for one and at least certain for the other. It is clearly more profitable to examine the associations and relations of diffusion and convergence, the conditions under which they supplement each other. Besides parallels springing up wholly independently, there are two ways in which their relations to diffusion may be conceived. An original single growth or wave of diffusion may differentiate into local or temporal modifications, which even after separation continue to develop along parallel lines or reconverge. Or, on the other hand, independent starts in similar direction may become merged in, or assimilated by, a subsequent diffusion.

103. Secondary Parallelism in the Indo-European Languages

Parallel growth secondary to a former unity and differentiation is illustrated by the Indo-European languages. All the known ancient forms of this speech family, Sanskrit, Avestan, Greek, Latin, Gothic, were highly inflecting and compounding. Their tendency was synthetic (§ 51, 57).

Grammatical ideas such as voice, tense, number, case, were expressed by elements affixed to the word stem and incapable of a separate existence. For *they will have loved* Latin says *ama-v-eri-nt.* The *-v-* has the force of *have,* the *-eri-* of *will,* *-nt* of *they;* but none of these parts can be used alone, as their equivalents in English can be, or as in French *ils auront aimé.* The two latter languages are analytical. They break an idea into parts which they express by separate words that change form but little. They retain only fragments of conjugations and declensions. Sanskrit had eight noun cases, Latin six; English has only two, the subjective-objective and the possessive, and French only one, or rather no case-form at all.

This development toward a more analytical form is not only traceable in several non-Indo-European speech families, such as Chinese and Malayo-Polynesian (§ 61), but has gone on in all the branches of Indo-European. It is visible in the growth of English from Anglo-Saxon; of French, Spanish, and Italian from Latin; of modern from ancient Persian; of Hindi and Bengali from Sanskrit. True, some of these have been in contact, like the Germanic and Latin languages, and might therefore be imagined to have set one another an example, although there is little evidence that languages seriously influence each other's forms. But many of the Indo-European idioms have not been in contact at all for thousands of years. The Germanic and the Indo-Iranic branches, for instance, must have separated at least four thousand years ago. For the greater part of this period, accordingly, the related but no longer communicating languages that have resulted in modern English and Bengali, to take only one instance, have independently driven toward the same goal of more and more analytical structure. It may well be that the hidden germ of this impulse lay implanted in the common Indo-European mother-tongue at the time of its differentiation five or more thousand years ago. But the movement of its daughters has certainly been an astoundingly parallel one.

104. Textile Patterns and Processes

An analogous situation is provided by the similarity of diamond shaped patterns woven in twilled baskets in parts of North and South America, Asia and the East Indies, and Africa. This looks like parallelism and is parallelism. But it is clearly a secondary result of the twilling process, as this, in turn, flour-

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[1] Grammarians generally recognize a greater number because they follow the example of ancient grammarians and are interested in the history or theory of language. But any one giving a purely empirical picture of French or English would put the situation as it is put here.

ishes most vigorously where woody monocotyledenous plants—cane, bamboo, palms—are available to furnish hard, durable, flat, pliable splints. The technique of the weave is such that if materials of two colors are used, the characteristic patterns evolve themselves almost of necessity. The twilling process may have been invented independently in several of the regions addicted to it, or have been devised only once in the world's history. It is too simple and too ancient a technique for modern knowledge to choose between the alternatives with positiveness. Brazilian and East Indian patterns are much more likely to have been each developed on the spot, as derivatives from the more fundamental and possibly transmitted twilling process.

The coiling technique for making baskets looks from its distribution in Africa and about the Mediterranean, in northeast Asia and northwest America, in the southern extremity of South America, in Malaysia and Australia, as if it had originated independently several times, and there is partial confirmation in the fact that different varieties of coiling are typical of most of the areas. If however further knowledge should connect the now separate areas of coiling, the art would then have to be regarded as probably due to diffusion from a single invention. In that case, however, special varieties, such as half-hitch coiling in Tierra del Fuego and Tasmania, and single-rod coiling in the East Indies and California, would remain as instances of secondary parallelism affecting particular aspects or parts of the generic process.

A blending of diffusion and parallelism is apparent also in other textile processes. The fundamentals, as embodied in simple woven basketry, mats, and wiers, were probably carried into America by the first immigrants. Weaving from suspended warps and in an incomplete loom frame may possibly have been similarly transmitted by diffusion or have been developed locally. Thread spinning, however, the complete loom, and the heddle were clearly devised in the middle region of America independently of their invention in the Old World, as is evident from their absence in the connecting areas of North America and Siberia (§ 187, 188). But the treadle shed, the next step in the Eastern hemisphere, was never invented in the Western, so that at this point the parallelism ends.

Again, diffusion and convergence both enter into the history of what is known as resist dyeing, that is, the covering of portions of textile patterns before immersion into the dye. Batik, when wax is used as the protecting medium, is one form of resist dyeing. Another method is "to tie little bunches of cloth with a cord either soaked in clay or wax or spun from fiber which has no affinity for the colors and then dip the tied web into the pot." In the Old World, tie dyeing is of Asiatic, probably of Indian origin, and was in use by the seventh century, perhaps earlier. The Mohammedan conquests carried the art to Malaysia on the one hand, to western Africa and Spain on the other, whence it was transmitted to the Indians of Guatemala after their subjugation by the Spaniards—like the double-headed eagle. The Peruvians, however, had long before hit upon the same art, as attested by textile remains in pre-Columbian graves. Here then, we have a wide and long enduring diffusion of the general resist dyeing process, and a locally limited instance of independent parallelism for one phase of it.

105. Primary Parallelism: the Beginnings of Writing

Primary parallelism can be established fairly frequently, but usually only with reference to a general principle, the applications of which invariably retain evidence of their original separateness.

An illustration is furnished by the history of writing, as sketched in the introductory paragraphs of the chapter on the Alphabet (§ 130-133). Many nations have entered the simple stage of pictography. Only a few are known to have gone on to the stage of rebus or transitional writing—mixed pictograms or ideograms and phonograms. Of these, certainly two and possibly as many as four, five, or six devised their own rebus systems: the Egyptians, Sumerians, Chinese, Hittites, Cretans, and Mayas, in four continents. But here the parallel ceases. The content of the systems, the signs themselves and their sound values, are wholly different. The similarity applies only to the principle of reading pictures or symbols for their pictureless homonyms. The concrete application of this method has nothing in common in the several parallel cases. Finally, complete phonetic writing was invented but once, all alphabets, however diverse, being historical descendants of the primitive Semitic alphabet, which served as the sole source of a tremendous diffusion (§ 134-149).

It is worth noting, however, that the first or pictographic stage of writing is by no means a thing that flows instinctively from all men. There are peoples, like some of the Indians of Brazil and California, deficient in the ability or habit, according as one may wish to term it, of expressing themselves in linear representations. They do not draw rude outlines to depict objects. Asked to do so, they profess inability, though set an example, or make a pathetically crude attempt. Their failure or refusal does not argue inherent lack of faculty, since the children of the same races, when put to school, draw figures with interest and often with success. The attitude of the adults is rather that of a person who had never heard even a snatch of music of any kind or seen an instrument, being taken to a concert and then asked to compose a simple little song. He would look upon this task as transcendently beyond his powers. There are no songless nations, but there are pictureless ones. Consequently picture-writing is not the spontaneous product which we, who as children are reared in an environment of pictures, might imagine it to be. If pictography were due to a primary parallelism, to a spontaneous outflow of the human mind, its absences would be in need of explanation. If, on the other hand, it is the result of a single diffusing development, this must have an antiquity of more than fifteen thousand years, as attested by the Old Stone Age paintings, and the failure of certain peoples to be affected is also in need of explanation.

Another case of parallelism is the recurring tendency to write syllabically instead of alphabetically. The Hindu inclination in this direction is discussed below (§ 146). That the phonetic symbols of rebus systems should be largely syllabic is small wonder, for they are pictures of things named with whole words. But the Hindu script was derived from a Semitic letter alphabet, and its essentially syllabic nature thus represents a reversion. The Japanese in adding 47 purely phonetic characters to the Chinese ideograms in order to express grammatical elements, proper names, and the like in their speech, denoted a syllable by each character. A third as many consonant and vowel signs would have answered the same purpose. When Sequoya the Cherokee devised an alphabet for his people in order to equate them with the whites, he incorporated the forms of a number of the English letters, but the values of all his signs were syllabic. The same holds of the West African Vei writing invented in the nineteenth century by a native. He had had enough mission schooling to be stimulated by the idea of writing, but "instinctively" fell back on syllable signs even though this necessitated two hundred different characters.

There is an evident psychological reason for the uniformity of these endeavors: we image words, in fact produce them, in syllables, not in sounds. Any one, in slow speech, tends to syllabify, whereas few wholly illiterate people can be induced without patient training to utter the separate consonants and vowels of a word, even for the purpose of teaching a foreigner.

This case of parallelism rests, therefore, on a psychological fact of apperception. But it was the "accidents" of culture, not innate psychology, that determined the particular symbols, and their values, chosen by the Hindus, Japanese, Cherokee, and Vei, with the result that in these symbols there is no specific similarity.

106. Time Reckoning

Still another case of primary parallelism is provided by the Maya-Aztec system of time denotation by coupling two series of symbols in an overlapping system of permutations, as described below (§ 197). This is as if we denoted the successive days of the year 1 January, 2 February, 3 March, and so on, until, having come to 12 December we went on 13 January, 14 February, and so once more around until 31 July was reached, when the next days would be 1 August and 2 September instead of February 1 and 2. Cumbersome and strange as this system appears, an exact parallel to it in principle was devised by the Hellenistic philosophers when they coupled the twenty-four hours of the day with the seven planets in a 168-hour cycle which gave the order and names to the days of the week (§ 124). A third case occurs in China where ten "celestial stems" and twelve "terrestrial branches" were permutated to form a sixty year chronological cycle.[1] All three of these devices are based on the same mathematical principle and serve the same end of time reckoning. But their content and result is different. The Greeks combined 24 with 7, the Chinese 12 with 10, the Mayas 13 with 20 and 260 with 365; and the periods treated ranged from hours to years.

These cases of primary parallelism allow the inference that there are certain inherent tendencies of the human mind in certain directions, such as operation in rebus reading, syllabic writing, reckoning by least common multiples. Here, then, is a seeming approach for a definite psychological interpretation of the history of civilization. Yet the results of such a method of attack must not be overestimated. The generic manner of culture in these several instances is indeed uniform enough to permit the conclusion that it springs from a uniform impulse or bent of the mind. But all the particular, concrete content of these cultural manifestations is as diverse as their historical origins are separate; which means that psychology may explain what is phychological in the cases, but that a larger cultural constituent remains over before which the generically valid principles of psychology are ineffective as explanations. As in the case of the influence of physical environment it might be said that psychological factors provide the limiting conditions of cultural phenomena.

107. Scale and Pitch of Pan's Pipes

A startling parallelism has been demonstrated between the Pan's pipes of the Solomon islands in Melanesia and those of the northwest Brazilian Indians. The odd pipes differ, each from the next, by the interval of a fourth. The even pipes give notes half-way in pitch between the adjacent odd ones, and thus form another "circle of fourths." But the similarity does not end here. The absolute pitch of the examined instruments from Melanesia and Brazil is the same. Thus, the vibration rates in successive pipes are 557 and 560.5; 651 and 651; 759 and 749;

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[1] $12 \times 10 = 120 \div 2$ (highest common factor of 10 and 12) $= 60$.

880 and 879! This is so close a coincidence as to seem at first sight beyond the bounds of accidental convergence. The data have in fact been offered, and in some quarters accepted, as evidence of a historical connection between the western Pacific and South America. Yet the connection would have had to be ancient, since no memory of it remains nor is it supported by resemblances in race, speech, nor anything obvious in culture. The instruments are perishable. Primitive people, working by rule of thumb, would be unable to produce an instrument of given absolute pitch except by matching it against another, and perhaps not then. Moreover, it is not known that absolute pitch is of the least concern to them. It is therefore incredible that this correspondence rests on any ancient diffusion: there must be an error in the record somewhere, or the one accident in a million has happened in the particular instruments examined.

The identity of scale or intervals however remains, and may be a true case of parallelism. Only, as usual, it boils down to a rather simple matter. The circles of fourths evidently originate in the practice, in both regions, of overblowing the pipes. This produces over-tones; of which the second, the ''third partial tone,'' is the fifth above the octave of the fundamental, so that successive notes in either the odd or even series of pipes, would, on the octave being disallowed, differ by fourths. The basis of the resemblance, then, is a physical law of sound. The cultural similarity shrinks to the facts of pipes in series, the use of overblown tones, and the intercalating odd-even series. Even these resemblances are striking, and more specific than many cited cases of parallelism. In fact, were they supported by enough resemblances in other aspects of culture, they would go far to compel belief in actual connections between Melanesia and Brazil.

108. BRONZE

A striking case of independent development is offered by the history of bronze. Bronze is copper alloyed with five to twenty per cent of tin. The metals form a compound with properties different from those of the two constituents. Tin is a soft metal, yet bronze is harder than copper, and therefore superior for tools. Also, it melts at a lower temperature and expands in solidifying from the molten condition, and thus is better material for castings.

In the eastern hemisphere bronze was discovered early and used widely. For nearly two thousand years it was the metal par excellence of the more advanced nations. A Bronze Age, beginning about 4,000 B.C., more or less simultaneously with the first phonetic writing, is recognized as one of the great divisions of cultural time (§ 66, 225).

In the western hemisphere bronze was apparently invented later than in the eastern and spread less extensively. It was discovered in or near the Bolivian highland, which is rich in tin (§ 196). From there its use diffused to the Peruvian highland, then to the coast, then north to about Ecuador, and finally, perhaps by maritime contacts, to Mexico, where local deposits of tin were probably made use of after their value was realized.

Theoretically, it might be queried whether knowledge of bronze had possibly been carried to the Andes from the eastern hemisphere by some now forgotten migration or culture transmission. Against such a supposition there stands out first of all the isolated and restricted distribution of the South American bronze art. It is ten thousand miles by land from the metal-working nations of Asia to the middle Andes. A people or culture wave that had traveled so far could not but have left traces of its course by the way. The utilitarian superiority of bronze over stone tools is so great that no people that had once learned the art would be likely to give it up. Even if here and there a group of tribes had retrograded, it cannot be imagined that all the nations between China and Peru could have slipped back so decisively. Certainly peoples like the Mayas and Chibchas, expert metallurgists, would never have abandoned bronze-making.

The theory of a Chinese junk swept out of its course and washed on a South American shore might be invoked. But the original South American bronze culture occupies an inland mountain area. Further, while Asiatic ships have repeatedly been wrecked on the Pacific coast of North America and probably at times also on that of South America, there is everything to indicate that the civilizational effects of such accidents were practically nil. The highest cultures of Mexico and South America were evolved in interior mountain valleys or plateaus. Not one of the great accomplishments of the American race—architecture, sculpture, mathematics, metallurgy—shows any specific localization on the shore of the Pacific.

Further, it is hard to understand how the arrival of a handful of helpless strangers could initiate an enduring culture growth. It is easy enough for us, looking backward through the vista of history, to fancy the lonely Indians standing on the shore to welcome the strangers from the west, and then going with docility to school to learn their superior accomplishments. Actually, however, people normally do not feel or act in this way. Nations are instinctively imbued with a feeling of superiority. They look down upon the foreigner. Even where they admit his skill in this matter or that, they envy rather than admire him. Thus, there is historic record of Oriental and European vessels being wrecked on the Pacific coast of North America, during the last century and a half, among tribes that were still almost wholly aboriginal. In no case did the natives make any attempt to absorb the higher culture of the strangers. Generally these were enslaved or killed, their property rifled; sometimes the wreck was set on fire. The greed for immediate gain of the treasures in sight proved stronger than any dim impulses toward self-improvement by learning.

As one conservative author has put it, occasional visits of Asiatics or Pacific islanders to the shores of America would be, from the point of view of the growth of the vast mass of culture in that continent, "mere incidents." From the review given below, in Chapter XIII, it is clear that the main determinants of American culture accumulation, after the first primitive start, were internal; and the case seems as clear for metal working as for any phase.

109. Zero

One of the milestones of civilization is the number symbol zero. This renders possible the unambiguous designation of numbers of any size with a small stock of figures. It is the zero that enables the symbol 1 to have the varying values of one, ten, hundred, or thousand. In our arithmetical notation, the symbol itself and its position both count: 1,234 and 4,321 have different values although they contain the identical symbols. Such a system is impossible without a sign for nothingness: 123 and 1,023 would be indistinguishable. Our zero, along with the other nine digits, appears to be an invention of the Hindus approximately twelve or fifteen hundred years ago. We call the notation ''Arabic'' because it was transmitted from India to Europe by the Arabs.

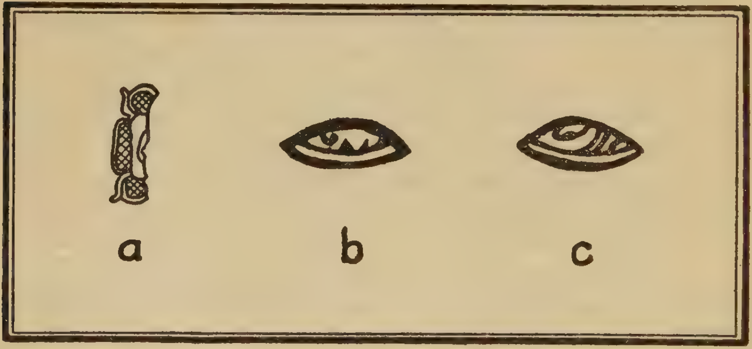

Fig. 28. Maya symbols for zero: *a*, monumental; *b*, *c*, cursive. (From Bowditch.)

Without a zero sign and position values, two methods are open for the representation of higher numerical values. More and more signs can be added for the high values. This was done by the Greeks and Romans. MV means 1,005, and only that. This is simple enough; but 1,888 requires so cumbersome a denotation as MDCCCLXXXVIII—thirteen figures of six different kinds. A simple system of multiplying numbers expressed like this one is impossible. The unwieldiness is due to the fact that the Romans, not having hit upon the device of representing nothingness, employed the separate signs I, X, C, M for the quantities which we represent by the single symbol 1 with from no to three zeroes added.

The other method is that followed by the Chinese. Besides signs corresponding to our digits from 1 to 9, they developed symbols corresponding to ''ten times,'' ''hundred times,'' and so on. This was much as if we should use the asterisk, *, to denote tens, the dagger, †, for hundreds, the paragraph, ¶, for thousands. We could then represent 1,888 by 1 ¶ 8 † 8 * 8, and 1,005 by 1 ¶ 5, without any risk of being misunderstood. But the writing of the numbers would in most cases require more figures, and mathematical operations would be more awkward.

The only nation besides the Hindus to invent a zero sign and the representation of number values by position of the basic symbols, were the Mayas of Yucatan. Some forms of their zero are shown in Figure 28. This Maya development constitutes an indubitable parallel with the Hindu one. So far as the involved logical principle is concerned, the two inventions are identical. But again the concrete expressions of the principle are dissimilar. The Maya zero does not in the least have the form of our or the Hindus' zero. Also, the Maya notation was vigesimal where ours is decimal. They worked with twenty fundamental digits instead of ten. Their "100" therefore stood for 400, their "1,000" for 8,000.[1] Accordingly, when they wrote, in their corresponding digits, 1,234, the value was not 1,234 but 8,864. Obviously there can be no question of a common origin for such a system and ours. They share an idea or a method, nothing more. As a matter of fact, these two notational systems, like all others, were preceded by numeral word counts. Our decimal word count is based on operations with the fingers, that of the Maya on operations with the fingers and toes. Twenty became their first higher unit because twenty finished a person.

It is interesting that of the two inventions of zero, the Maya one was the earlier. The arithmetical and calendrical system of which it formed part was developed and in use by the time of the birth of Christ. It may be older; it certainly required time to develop. The Hindus may have possessed the prototypes of our numerals as early as the second century after Christ, but as yet without the zero, which was added during the sixth or according to some authorities not until the ninth century. This priority of the Maya must weaken the arguments sometimes advanced that the ancient Americans derived their religion, zodiac, art, or writing from Asia. If the zero was their own product, why not the remainder of their progress also? The only recourse left the naïve migrationist would be to turn the tables and explain Egyptian and Babylonian civilization as due to a Maya invasion from Yucatan.

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[1] Or 360 and 7,200 respectively in calendrical notations.

110. Exogamic Institutions

In many parts of the world nations live under institutions by which they are divided into hereditary social units that are exogamous to one another. That is, all persons born in a unit must take spouses born in some other unit, fellow members of one's unit being regarded as kinsmen. The units are generally described as clans, gentes, or sibs; or, where there are only two, as moieties. In many cases the sibs or moieties are totemic; named after, or in some way associated with, an animal, plant, or other distinctive object that serves as a badge or symbol of the group. Often the association finds expression in magic or myth. Since under this system one is born into his social unit, cannot change it, and can belong to one only, it follows that descent is unilateral. It is impossible for a man to be a member of both his father's and his mother's sib or totem; custom has established everywhere a rigid choice between them. Some tribes follow descent from the mother or matrilinear reckoning, others are patrilinear.[1]

Institutions of this type have a wide and irregular distribution. They are frequent in Australia, New Guinea, and Melanesia; found in parts of the East Indies and southeastern Asia; quite rare or stunted in the remainder of Asia and Polynesia; fairly common in Africa, though they occur in scattered areas; characteristic again of a large part of North America, but confined to a few districts of South America. At a rough guess, it might be said that about as many savage peoples, the world over, possess totemic-exogamous clans or moieties as lack them. The patchiness on the map of exogamic institutions argues against their being all the result of a wave of culture transmission emanating from a single source. Had such a diffusion occurred, it should have left its marks among the numerous intervening tribes that are sibless. Further, both in the eastern and western hemispheres, the most primitive and backward tribes are, with fair regularity, sibless and non-totemic. If therefore a hypothetical totem-sib movement had encircled the planet, it could not have been at an extremely ancient date, else the primitive tribes would have been affected by it; and since records go back five thousand years in parts of the Mediterranean area, the

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[1] This section will not be found confusing if it is read with the following points clearly in mind. A tribe is a political unit, a sib or clan or moiety a social unit forming one of several divisions of such a political unit. A tribe corresponds in savage or barbarous life to the state or nation among ourselves. The sib is a sort of enlarged family. The blood relationship is often mainly fictitious, but it is considered actual or treated as such, and is the basis of the prohibition of marriage within the sib. The origin of the sib seems to have been the family. The terms sib, clan, and gens are here used synonymously. Some writers restrict "clan" to sibs with descent in the female line, "gens" to sibs with male descent. Sib is perhaps the best general term, clan the one most used.

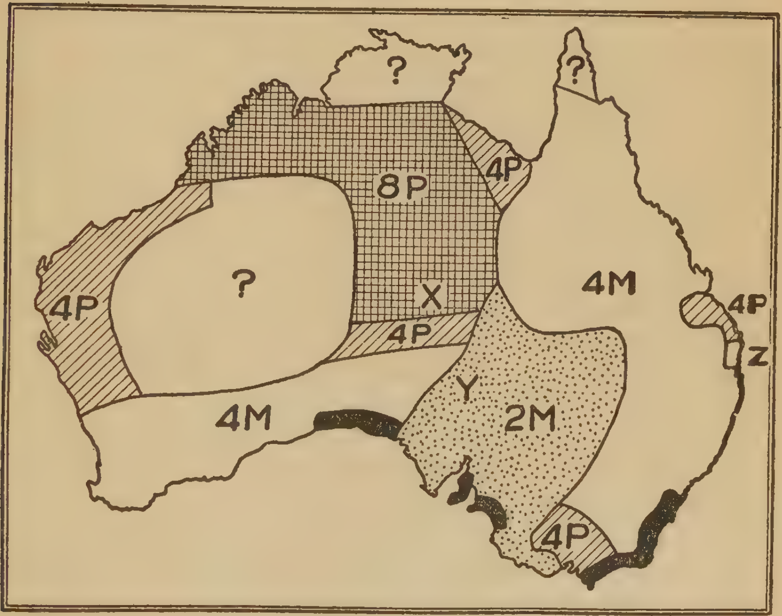

FIG. 29. Distribution of types of exogamic institutions in Australia: *2M,* two classes, matrilinear; *4M,* four classes, matrilinear; *4P,* four classes, patrilinear; *8P,* eight classes, patrilinear; black areas, no classes, patrilinear exogamic totems; *X,* totems independent of classes; *Y,* totems replace sub-classes; *Z,* no organization; *?,* uninhabited or unknown. (After Thomas and Graebner.)

movement, if relatively late, should have left some echo in history, which it has not.

It is therefore probable that totem-sib institutions did not all emanate from one origin, but developed independently several times. The question then becomes, how often, and where?

The evidence for America has been reviewed in another connection (§ 185). It can be summarized in the statement that at least two of the three sib areas[1] of North America, and probably the two principal ones of South America, seem to have resulted from a single culture growth which perhaps centered at one time, although subsequently superseded, in the middle sector of the double continent. This movement may have had first a patrilinear and then a matrilinear phase, though at no great interval of time. The third North American area may have got its patrilinear sib institutions from the same source but probably developed its matrilinear ones locally as a subsequent growth. If so, this would be an instance of convergence on the same continent—a rather rare phenomenon.

For Australia, New Guinea, and Melanesia, the geographical proximity is so close as to suggest a single origin for the whole area. Patrilinear and matrilinear descent are both found in Australia as well as Melanesia. This fact has been interpreted as the result of an earlier patrilineal and a later matrilineal phase of diffusion. It is interesting that this conclusion parallels the tentative one independently arrived at for America, although in both hemispheres further analysis and distributional study must precede a positive verdict.

In the principal other sib area, Africa, the reckoning is so prevailingly patrilineal, that the few cases of matrilineate can scarcely be looked upon as anything but secondary local modifications. As to whether the totemism and exogamy of Africa can be genetically connected with those of Australia-Melanesia, it is difficult to decide. The more conservative attitude would be to regard them as separate growths, although so many cultural similarities have been noted between western Africa and the area that stretches from Indo-China to Melanesia, as to have raised suspicions of an actual connection (§ 270). Yet even if these indications were to be confirmed, thus sweeping most or all the Old World sib institutions into a single civilizational movement, the distinctness of this from the parallel development of the New World would remain.

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[1] Three out of four, to be exact; but two eastern areas, which are almost in contact and perhaps rather closely connected in history, are for convenience treated here as if they were one.

It is significant that in the three successive continents of America, Oceania, and Africa the patrilinear and matrilinear phases of the sib type of society exist side by side, and that the same duality even holds for each of the separate areas in America. That is, the Northwest American sib area includes matrilinear as well as patrilinear tribes; the Southwest area includes both; and so on.

A similar tendency toward geographical association is found in other phases of social structure: the clan and moiety, and again totemism and exogamy.

The clan or multiple form of sib organization is logically distinct from the moiety or dual form. Under the plural system, a person, being of clan A, may marry at will into clans B, C, D, E, F. Three of his four grandparents would normally be of other clans than his own, but of which they were members, would vary in each individual case. In a patrilineal society, one member of clan A would have his maternal uncles of clan B; the next, of clan C; a third, perhaps of clan F; according to the choices which their fathers had made of wives.

Under the dual system, however, a member of moiety A may just as well be regarded as having a wife of moiety B prescribed or predestined for him as being forbidden an A wife. Two of his grandparents, say his father's father and his mother's mother, are inevitably of his own moiety, the two others of the opposite one. Every possible kinsman—his maternal uncle, his cross cousin, his father-in-law, his wife's brother-in-law, his daughter's son—has his moiety affiliation foreordained. Where descent is paternal, for instance, everybody knows that his future mother-in-law must be of his own moiety. Evidently the effect of this dual system on the relations between kinsfolk, on social usages, on the individual's attitude of mind toward other individuals, should normally tend to be profoundly different from the influence of a multiple clan system. On theoretical grounds it might seem likely that the dual and multiple schemes had nothing to do with each other, that they sprang from distinct psychological impulses.

Yet such a belief would be ungrounded, as the facts of distribution promptly make clear. In every multiple sib area of any moment, moieties also occur, and vice versa. In the California-Southwest region, for instance, tribes like the Miwok are divided into moieties only, the Mohave and Hopi into clans only, the Tewa and Cahuilla into moieties subdivided into clans. So in the Eastern, the Plains, and the Northwest areas of North America, clan tribes and moiety tribes live side by side; whereas as soon as these regions are left behind, there are vast districts —much of Mexico, Texas, the Great Basin and Plateau, northern Canada and the Arctic coast—whose inhabitants get along without either clans or moieties. So again in Melanesia and in Australia (Fig. 29), the two types of organization exist side by side, while most of Polynesia, Asia, and Europe are void of both. Only Africa shows some development of multiple clan institutions but no moieties. In short, as soon as areas of some size are considered, they prove in the main to be of two kinds. Either they contain both clan tribes and moiety tribes, or they contain neither. That is, the clan institution and the moiety institution are correlated or associated in geography, as patrilinear and matrilinear descent are correlated, which indicates a community of origin for them.

A similar relation exists between exogamic units, be they moieties or clans, and totemism. The first constitutes a scheme of society, a method of organization; the second, a system of symbolism. Sibs are social facts, totems a naming device with magico-religious implications. There is no positive reason why they should be associated. They are not always associated. There are American tribes like the Navaho and Gros Ventre that live under unilateral and exogamic institutions without totems. Placenames or nicknames distinguish the groups. In Australia, the Arunta possess unilaterally reckoning exogamic groups as well as totems, but the two are dissociated; a person takes his group by descent, his totem wholly irrespective of this according to place of birth or conception. In Africa there are no less than six tribes or series of tribes in which exogamy and totemism are thus dissociated; a person takes his totem from his father, his exogamic unit from his mother, so that the two ordinarily do not coincide for parent and child. Exogamy and totemism, then, are theoretically separate factors.

Yet since they are distinct, it is remarkable that in probably seven or eight tenths of all cases they coincide, and that in each of the continents or areas containing them they are found associated. If exogamy and totemism had grown out of separate roots, one could expect at least one considerable area somewhere in which one of them appeared without the other. But there is no such area. Wherever social exogamy appears among a larger group of nations, social totemism also crops out; and vice versa.

It must then be concluded that exogamy and totemism, matrilineate and patrilineate, multiple and dual sibs, all show a strong tendency toward association with one another. In other words, their correlation is positive and strong. Even where they seem mutually exclusive in their very nature, like matrilinear and patrilinear reckoning, ways have been found by unconscious human ingenuity to make them coexist among one people, as when one reckoning is attached to the exogamy, the other to the totemism; and still more often they occur among adjacent tribes.

111. Parallels and Psychology

Such associations as these are common enough in the history of civilization. A number are touched upon elsewhere in this volume under the name of culture trait associations or complexes (§ 97, 149). But usually such a complex or nexus consists of culture elements that have no necessary connection: Christianity and trousers, for instance. It is accident that first throws them together; association ties them one to the other; once the cluster is established by usage, its coherence tends to persist. But there is something arbitrary about this cohesion, generally. There is no inherent reason why a hundred American tribes that grow maize should also grow beans and squashes and nothing else; but they do limit themselves to the three. The distinctive feature of the sib-complex is that it has an almost reasonable quality. Its elements, however separate or even opposite logically, do have a certain psychological affinity to one another. Also, the arbitrary maize-beans-squash complex and other complexes are generally not duplicated. But the intricate and psychologically founded totemism-exogamy-descent complex looks as if it might have been triplicated or quadruplicated. This parallelism, if the facts prove to substantiate it, is parallelism raised to a higher power than any yet considered. Heretofore the discussion has been of the parallelism of single culture traits. Here it is a case of parallelism of a complex of culture traits. Such complex convergence might suggest something peculiar to or inherent in the human mind, leading it, once it is stimulated to commence the development of one of the factors of the complex, to follow with the production of the other factors.[1]

Similar instances would be the tendency of agriculture to be followed by town life, if it could be demonstrated, though this seems doubtful; of settled living to be accompanied by migration legends; of religions with personal founders to become propagandizing and international but in time to die out among the nations in which they were originated.

In regard to all such cases it may be said first of all that an exhaustive analysis is necessary to ascertain whether the seeming association or correlation is borne out by the facts. Second, the possibility of diffusion must be eliminated. If Melanesian and African totem-exogamy are both products of one culture growth, they cannot be counted as two examples of the same association. If they should ultimately both prove to be linked with the American system by a wave of migration or culture contact, as has indeed been maintained in two separate hypotheses recently advanced, parallelism is of course disproved altogether. But such views are as yet undemonstrated and seem extreme; and if, after continued search of the evidence, two or more such associations or complex parallels as the exogamic-totemic scheme of society stand as independent growths, it is evident that they will be something in the nature of cultural manifestations of psychological forces. In short, we should then be beginning to grasp specific psychological determinants for the phenomena or events of civilization. But as yet such a causal explanation of the data of anthropology by the mechanism of psychology has not been achieved.

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[1] It is perhaps hardly necessary to remark that the association here found between the various elements of the exogamic complex would not conflict with patrilinear descent being on the whole the earlier and matrilinear the later phase to appear in each of the independent developments of the complex. Nor would it prevent each separate continental development from undergoing its own history of diffusion, as represented in § 185.

112. LIMITATIONS ON THE PRINCIPLE

From the evidences reviewed in this and the last chapter, the conclusion is confirmed which social philosophers had long since reached, that imitation is the normal process by which men live, and that invention is rare, a thing which societies and individuals oppose with more resistance than they are ever aware of, and which probably occurs only as the result of the pressure of special circumstances, although these are as yet little understood. Not only are a hundred instances of diffusion historically traceable for every one of parallelism, but the latter is regularly limited in scope. Something tends to make us see phenomena more parallel than they actually are. They merely spring from the same impulse, they inhere in the properties of objects or nature, they bear resemblance at one point only—and differ at all other points. Yet they tend to impress us, in some mysterious way, as almost identical. The history of civilization has no more produced two like cultures, or two separately developed identical culture traits, than has the evolution of organic life ever duplicated a species by convergently modifying two distinct forms. A whale may look fishlike, he is a mammal. The Hindu and the Maya zero are logically the same; actually they have in common nothing but their abstract value: their shapes, their place in their systems, are different. The most frequent process of culture history therefore is one of tradition or diffusion in time and space, corresponding roughly to hereditary transmission in the field of organic life. Inventions may be thought of as similar to organic mutations, those "spontaneous" variations that from time to time arise and establish themselves. The particular causes of both inventions and mutations remain as good as unknown. Now and then a mutant or an invention heads in the same direction as another previously arisen one. But, since they spring from different antecedents, such convergences never attain identity. They remain on the level of analogous resemblance. Substantial identity, a part for part correspondence, is invariably a sign of common origin, in cultural as well as organic history.

CHAPTER X

THE ARCH AND THE WEEK

113. House building and architecture.—114. The problem of spanning.—115. The column and beam.—116. The corbelled arch.—117. The true arch.—118. Babylonian and Etruscan beginnings.—119. The Roman arch and dome.—120. Mediæval cathedrals.—121. The Arabs: India: modern architecture.—122. The week: holy numbers.—123. Babylonian discovery of the planets.—124. Greek and Egyptian contributions: the astrological combination.—125. The names of the days and the Sabbath.—126. The week in Christianity, Islam, and eastern Asia.—127. Summary of the diffusion.—128. Month-thirds and market weeks.—129. Leap days as parallels.

In exemplification of the principles discussed in the last two chapters, the next two are given over to a more detailed consideration of several typical ramifying growths whose history happens to be known with satisfactory fullness. These are the arch, the week, and the alphabet.

113. House Building and Architecture

The history of human building makes a first impression of an endless tangle. Every people rears some sort of habitations, and however rude these are, structural principles are involved. Obviously, too, geography and climate are bound to have at least a delimiting influence. The Eskimo of the Arctic cannot build houses of wood; the inhabitants of a coral reef in the Pacific could not, however much they might wish, develop a style in brick. In structures not used as dwellings, their purpose necessarily affects their form. A temple is likely to be made on a different plan from a court of law. Temples themselves may vary according to the motives and rituals of the religions which they serve.

Bewilderment begins to abate as soon as one ceases trying to contemplate all buildings reared by human hands. Obviously a dwelling erected by a small family group for the utilitarian purpose of shelter is likely to be more subject to immediate adaptations to climate than a large communal structure serving some purpose such as the service of a deity. If consideration be restricted still further, to religious or public buildings set up with the idea of permanence, another class of causes making for variability begins to be eliminated. A structure intended as an enduring monument is reared with consideration to the impression that it will create in the minds of future generations. Its emotional potentialities, be these evoked by its mere size, by the æsthetic nature of its design, or by a combination of the two, come into the forefront. Such permanent buildings being in stone or brick, techniques which flourish in wood or other temporary materials are eliminated. Finally, a monumental structure is possible only at the hands of a community of some size. An unstable group of nomads, a thinly scattered agricultural population, cannot assemble in sufficient numbers even for periods each year, to carry out the long-continued labors that are necessary. The aggregation of numbers of men in one spot is always accompanied by specialization in advancement of the arts. Consequently the very fact that a structure is monumental involves the probability that its builders are able to rise above the limitations of mere necessity, and can in some degree execute products of their imagination.

114. The Problem of Spanning

If now our attention be confined to large buildings of the more massive and permanent sort, it becomes clear that one of the chief problems which all their constructors have had to grapple with, is that of roofing large spaces and spanning wide openings in walls. A pyramid can be heaped up, or a wall reared to a great height, without much other than quantitative difficulties being encountered. A four hundred foot pyramid does not differ in principle from the waist-high one that a child might pile up. The problems which it involves are essentially the economic and political ones of providing and controlling the needed multitudes of workers. Architecture as such is in abeyance and the engineering problems involved are mainly those of transporting and raising large blocks of stone. Much the same holds of walls. The Incas, for instance, reared masonry of astounding massiveness and exactness without ever seriously attempting to solve architectural problems.

Once, however, a structure is planned to cover a wide space, it becomes architecturally ambitious. The roof of a large dwelling can be made easily of poles and thatch by such collaborators as a family might muster. But to span a clear space of some size in stone requires more than numbers of workers. The accomplishment also yields definite sense of achievement which is strong in proportion as the extent of the ceiling is great. The difficulties are diminished in proportion as the mass of the structure is large and the clear space is small, but the satisfying effect is correspondingly decreased. A vault whose walls are thicker than its interior is wide, produces as chief impression an effect of massiveness. One feels the solidity of the structure, the amount of labor that has gone into it; but one is left without the sense of a worth-while difficulty having been self-imposed and mastered. Sooner or later, therefore, after men began to hold themselves available for co-operative enterprises in numbers, adventurous minds must have been fired with a desire to grapple with problems of æsthetic construction, and to leave behind them monuments of triumphant solution. The story of these voluntary and imaginative endeavors is the history of monumental art.

Two principal methods have been followed in the solution of the problem of covering large free spaces. The first is the method of the column and the lintel; the second that of the arch or vault. The column and lintel do not differ fundamentally from the idea of the wall with superimposed roof beams. The elements of both are vertical support and horizontal beam. In the arch, however, this simple scheme is departed from, and the covering elements take on a curved or sloping form. The apparently free float of the span is stimulatingly impressive, especially when executed in a heavy and thoroughly rigid material. The beam is subject to bending stress. Timber makes a good material because of its strength against breakage by bending. Stone is unreliable or outrightly weak against a bending stress, besides adding to the stress by its own weight. There are therefore inherent limitations on the space that can be covered by a horizontal stone beam.

115. The Column and Beam

Most early architecture developed the column. Even so superb an architecture as that of the Greeks never rose above it. The æsthetic value of the Parthenon lies in the balance and feeling with which a fundamentally simple plan has been elaborated, not in the daring way in which an inherently ambitious problem has been met.

On account of its essential simplicity, columnar architecture grew up among several historically unconnected nations. In the case of most of them, there can be distinguished an early stage of building in wood, when the column was the trunk of a tree, and a later stage in which the post was replaced by a monolith, or by superimposed drums of stone. This change appears to have taken place somewhat independently in Egypt and in Greece, and wholly so in Mexico. It has been thought that Greek architecture was derived from Egypt, but there was probably little more than a transmission of stimulus, since Greek temples were wooden pillared several thousand years after the Egyptians were rearing huge stone columns. Furthermore, if the Greeks had borrowed their column outright from Egypt, they would probably have copied it slavishly at the outset. Yet their early capitals are without the lotus flower head in which the Egyptian column terminated. Here, then, and still more in Mexico, there was parallel development.

The failure of the Greeks to pass beyond column and lintel architecture may seem strange for a people that showed so unusual an artistic faculty and so bold and enterprising a spirit as they manifested in most departments of civilization. The cause appears to lie not in any internal arrest of their artistic evolution, but in the conditions that prevailed in another field of their culture: their political particularity. The Greek state remained a city. All attempts to establish larger political aggregates, whether on the basis of confederation or conquest, failed miserably and speedily. The Greek was ingrainedly addicted to an outlook that was not merely provincial but literally municipal. The result was that really large coöperative enterprises were beyond him. Paved roads, aqueducts, sewers, and works of a like character were scarcely attempted on any scale of magnitude. With the rather small numbers of individuals which at best the Greeks assembled in one spot, such works were not necessary, and undertaken in mere ambition, they would have encountered public antagonism. Consequently Greek public buildings were, by the standards of many other nations, mediocre in size of ground plan, low in height, without endeavor to impress by sweep of clear space. This fact illustrates the almost organic interconnection existing between the several sides of the culture of any people; it illustrates also the importance of knowing the whole of a civilization before trying to provide an explanation for any one of its manifestations.

116. The Corbelled Arch

The arch brings in an inherently new principle of architecture. It is a device for carrying construction over an empty space without horizontal beams. But it may take two principal forms: the corbelled or "false" arch, and the "true" arch. Both are arches in form, but the blocks that form the curvature of one are not self-supporting; in the other they are.

The corbelled arch achieves its span through a successive projection of the stones or bricks that abut on each side of the open space. The stone at the end of the second course of masonry extends part of its length beyond the end stone of the first course. At the opposite side, the second course hangs similarly out above the first. In the third course, the end blocks again project beyond those of the second. The arrangement thus is that of two series of brackets, or two staircases turned upside down. The higher the masonry rises, the more do the clear space narrow and the two lines of hanging steps approach until they meet and the arch is complete. What keeps the projecting stones from toppling into the clear space? Nothing, obviously, but such weight as is put on their inner or embedded ends. Suppose a stone projects a third of its length beyond the one below, so that its center of gravity is still above the lower stone. It will then lie as placed. Suppose still another stone again projects a third of its length beyond the second. Its center of gravity now falling outside the lowest block, it will topple both itself and the second one. Only if other blocks are inserted behind will their counterweight hold up the projecting blocks. Obviously, there will be more such counterweights needed the higher the side of the arch rises. In general, the area of wall needed as counterweight is at least as great as the area of overhanging. If the arch is to clear ten feet horizontally—hanging over five feet from each side—there must be five feet or more of masonry built up on each side of the clear space. A corbelled arch forming a relatively small doorway in the face of a wall presents no difficulty, but a corbelled arch that stands free is impossible.

The same principle holds for the vault, which is a three-dimensional extension of the virtually two-dimensional arch. The hollow or half-barrel of the corbelled vault has to be flanked by a volume of building material exceeding its own content. This need eliminates corbelling as a possible method of rearing structures that rise free and with lightness. Hence the clumsy massiveness of, for instance, Maya architecture, which, so far as it employs the vault, often contains more building material than spanned space.

Another difficulty, beyond that of counterweighting, which besets the user of the corbelled arch, is that the projecting stones of each course are subjected to the same bending strain as a beam. The weight above strives to snap them in two.

The corbelled arch and vault have been independently devised and have also diffused. They were employed in gigantic Bronze age tombs at Mycenæ in Greece—the so-called treasure house of Atreus,—in Portugal, and in Ireland (Fig. 41). These developments seem historically connected. On the other hand the Mayas of Yucatan also built corbelled arches, which must constitute a separate invention. This parallel development differs from that of the true arch, which seems everywhere to be derived from a single original source.

117. THE TRUE ARCH

The true arch differs from the corbelled in needing no counterweight. The blocks that form the under surface or soffit of its span are self-sustaining. The true arch thus yields an æsthetic satisfaction which can be attained in no other way, especially when it soars in magnitude. The fundamental principle of the true arch is the integration of its elements. Such an arch is nothing until completed; but from that moment its constituents fuse their strength. Each block has a shape which is predetermined by the design of the whole, and each is useless, in fact, not even self-supporting, until all the others have been fitted with it. Hence the figure of speech as well as the reality of the keystone: the last block slipped into place, locking itself and all the others. The features of the blocks or "voussoirs" which makes possible this integration, is the taper of their sides. Each is a gently sloping piece of wedge instead of a rectangular block. When bricks replace dressed stone, the mortar takes the place of this shaping, being thinner toward the inner face of the vault and thicker toward the interior of the construction.

A true arch in process of erection would instantly collapse if not held up. It can be built only over a scaffold or "centering." Once however the keystone has wedged its parts together, it not only stands by itself but will support an enormous weight. The greater the pressure from above, the more tightly are the blocks forced together. Instability in a true arch is not due to the bending stress coming from the superimposed mass, as in the corbelled arch or a horizontal roofing. The blocks are subjected only to crushing pressure, which stone and brick are specially adapted to withstand. The weakness of the arch is that it turns vertical into horizontal thrust. With more weight piled on top, the sidewise thrust, the inclination to spread apart, becomes greater, and must be resisted by buttressing. This is what the Hindus mean when they say that "the arch never sleeps."

118. Babylonian and Etruscan Beginnings

While the exact circumstances attending the invention of the true arch are not clear, the earliest specimens preserved are from the ancient brick-building peoples of Babylonia, especially at Nippur about 3,000 B.C. Thence the principle of the arch was carried to adjacent Assyria. Both these Mesopotamian peoples employed the arch chiefly on a small scale in roofing doors and in tunnels. It remained humble and utilitarian in their hands;

its architectural possibilities were scarcely conceived. They continued to rear their monumental structures mainly with an eye to quantity: high and thick walls, ramps, towers ascending vertically or by steps, prevailed.

The true arch and vault are next found in Italy, among a prosperous city-dwelling people, the Etruscans, some seven or more centuries before Christ. All through the civilization of this nation runs a trait of successful but never really distinctive accomplishment. The Etruscans were receptive to new ideas and applied them with energy, usually only to degenerate them in the end. Whether they discovered the arch for themselves or whether knowledge of it was carried to Italy from Asia is not wholly clear, since history knows little about the Etruscans, and archæology, though yielding numerous remains, leaves the problem of their origin dark. The Etruscans, or Tyrrhenians as the Greeks knew them, were however active traders, and a number of features in their civilization, such as liver divination (§ 97), as well as ancient tradition, connect them with Asia. It is therefore probable that the principle of arch construction was transmitted to them from its earlier Babylonian source. The Etruscans also failed to carry the use of the arch far into monumental architecture. They employed it in tombs, gates, and drains rather than as a conspicuous feature of public buildings.

119. THE ROMAN ARCH AND DOME

From the Etruscans their neighbors, the Romans, learned the arch. They too adopted it at first for utilitarian purposes. The great sewer of Rome, for instance, the Cloaca Maxima, is an arched vault of brick. Gradually, however, as the Romans grew in numbers and wealth and acquired a taste for public undertakings, they transferred the construction to stone and introduced it into their buildings. By the time their polity changed from the republican to the imperial form, the arch was the most characteristic feature of their architecture. The Greeks had built porticos of columns; the Romans erected frontages of rows of arches. The exterior of their circus, the Coliseum, is a series of stories of arches. Much of the mass of the structure also rests upon arches, thus making possible the building of the huge edifice with a minimum of material. On the practical side, this is one of the chief values of the arch. The skill which evolved it eliminates a large percentage of brute labor. Earlier peoples would have felt it necessary to fill the space between the interior tiers of seats and the outer wall of the Coliseum.

Once the fever of architecture had infected them, the Romans went beyond the simple arch and vault. They invented the dome. As the simplest arch, such as a doorway or window, a perforation in a wall, is essentially two dimensional, and a vault is the projecting of this plane area into the three dimensions of a half cylinder, so the dome can be conceived as the extension of the arch into another three-dimensional form, the half sphere. Their relations are those of a hoop, a barrel, and a hollow ball. Imagine a vault revolved on a central vertical pivot, and it will describe the surface of a dome. Two intersecting arches can be served by a single keystone. Theoretically, more and more arches can be introduced to intersect at the same point, until they form a continuous spheroid surface. Neither construction nor the evolution of the dome did actually take place by this method of compounding arches, which however serves to illustrate the logical relation of the two structures.

The Roman engineers put domes on their Pantheon, the tomb of Hadrian, and other buildings. In the centuries in which the Mediterranean countries were Romanized, the dome and the arch, the vault and the row of arches set on pillars, became familiar to all the inhabitants of the civilized western world. After Roman power crumbled, the architectural traditions survived. Even when there was decadence of execution and little monumental construction, the principles once gained were never lost.

120. Mediæval Cathedrals

With the emergence from the Dark to the Middle Ages, architecture revived with an application to churches instead of temples, circuses, and baths. In southern Europe adherence to the old Roman model remained close, and the style is known as Romanesque. In northern Europe the Roman principles found themselves on newer soil, tradition bound less rigorously, and the style underwent more modification. The arch became pointed at the top. Vertical building lines were elongated at the expense of horizontal ones, which in the lower and less brilliant sun of the north are less effective in catching light and shade and giving plastic effect than on the Mediterranean. The dominant effect became one of aspiration toward height. This is the so-called Gothic architecture, developed from the twelfth century on, most notably in northern France, with much originality also in England, and undergoing provincial modification in the various north European countries. In fact, the style was finally carried back into Italy, to compete there with the Romanesque order, as in the famous cathedral of Milan.

As an artistic design a Gothic cathedral is as different from an imperial Roman building as the latter from a Greek temple. Yet it represents nothing but a surface modification of Roman methods. Its essential engineering problems had been solved more than a thousand years earlier. The effect of a hemispherical arch associated with low round columns, and of a high pointed one soaring from tall clusters of buttresses, is as diverse as can be obtained in architecture. But so far as plan or invention are concerned, there is no decisive distinction between the two orders.

121. The Arabs: India: Modern Architecture

In the east, Roman architectural tradition was sustained without rupture and even carried forward in the Byzantine empire. The great church of St. Sophia at Constantinople is a sixth century example of a splendid dome set on four great arches and intersecting with smaller domes at its corners. From the Byzantine Greeks—or Romans as they long continued to call themselves—and perhaps from the neighboring Sassanian Persians, the principle of arch and dome came to the Arabs when these underwent their sudden expansion after the death of Mohammed. In nearly all the countries overrun by the Arabs, Mesopotamia, Syria, Egypt, North Africa, Sicily, and Spain, they encountered innumerable old public buildings or ruins. It was not long before they were emulating these. During the centuries superficial fashion does not stand still in architecture any more than in dress. The trousers of 1850 would seem out of place if worn in 1920, and yet the two garments are identical in basic plan. So with Roman and Arab or Saracenic architecture. The Arab sometimes twisted his columns and bulged his arch to horseshoe shape. He added no essential element.

Among the countries in which the Arabs built is Spain. Hence their architecture, in the form known as Moorish, influenced that of the Spaniards. They in turn carried the style to Mexico; from there it was transported to New Mexico and California, where converted Indians made and laid the adobe bricks of their mission churches according to the plans of the padres. Since the American occupation, the buildings and ruins of the Spanish period have stood out as landmarks, fired the imagination of visitors, and set the model for a type of architecture. Railroad stations and the like are now done in "Mission" style, which in essentials is nothing but Spanish Moorish architecture, as this again is only the Arab modification of the Roman original.

Along with Mohammedanism, the Roman-Saracenic architecture spread eastward also to India. In the sixteenth century Mohammedan conquerors of Mongol origin, known therefore as the Moguls, carved out a great empire in northern India. Prosperity resulted for several generations, and its memory was embellished by the erection of notable buildings. Perhaps the most famous of these is the tomb near Agra known as the Taj Mahal. Set in its sunlit environment, built of white marble, and its surface a maze of inlay in polished stone, this structure seems utterly unrelated to the grim, narrow, upward-stretching cathedrals of northern Europe with stained glass filling the spaces between their buttresses. Yet the central feature of the Taj Mahal is a great dome done on the identical plan as that of St. Sophia or the Pantheon and derived from them. What then one is wont to regard as the triumph of Indian architecture is not Indian at all; no more than Gothic architecture had any connection with the Goths. The one is Mohammedan, the other French. Both represent little else than the working out in new countries and in later centuries of an invention which the Romans had borrowed from the Etruscans and they from the Babylonians. The device diffused from Asia into Europe and Africa and returned after several thousand years, to flourish once more near its source of origin, enormously modified æsthetically and enriched with infinite refinement, but still without radical change.

It is an interesting commentary on the sluggishness of invention that whereas we to-day build in concrete and steel as well as in wood and brick and stone, and erect buildings of greater size as well as for a larger variety of purposes than ever before in history, yet we have so far been unable to add any new type of æsthetic design. Our public buildings, those intended to serve as monuments and therefore summoning the utmost abilities of the architect, still make use of the arch, vault, and dome, or fall back frankly on modifications of the Greek temple with its rows of columns. So far as the outside appearance of modern buildings goes, all our fine architecture is essentially a burrowing in the past to recombine in slightly new proportions, and for new uses, elements taken from the most diverse countries and ages, but forming part of only two lines of development. It may be, when we have built much longer in steel and concrete, and perhaps still newer materials, that the inherent properties of these may gradually force on a future generation of architects and engineers possibilities which indeed are now lying before us, but to which the resistance of the human mind to novelty blinds us.

122. THE WEEK: HOLY NUMBERS

The history of the week is also a meandering one. Its origins go back to a number cult. Many nations have a habit of looking upon some one number as specially lucky, desirable, holy, or perhaps unfortunate; at any rate endowed with peculiar virtue or power. Three and seven at once rise to mind, with thirteen as unfortunate. But the particular numbers considered mystic are very diverse. Few American Indian tribes, for instance, had any feeling about seven,[1] and still fewer about three. The latter, in fact, would have seemed to almost all of them imperfect and insignificant. Nearly all the Americans who were conscious of any preferential custom exalted four; and the remaining tribes, those of the North Pacific Coast, were addicted to five. The Africans were without any feeling for seven, except where they had come under Islamic or other foreign influences. The Australians and Pacific islanders also have not concerned themselves with seven, and the same seems to be true of those remoter peoples of northern Asia which remained until recently beyond the range of the irradiation of higher civilization.

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[1] It seems quite doubtful whether any American people held seven as a mystic number in pre-Columbian times. The case most frequently cited is that of the Zuñi. But these people had a Christian mission in their town for two centuries; they still employ four and six far more frequently than seven in their rituals; and their unmissionized neighbors the Hopi and Navaho esteem four or six but not seven. The other Indians stressing

This reduces the area in which seven is thought to have sacred power to a single continuous tract comprising Europe, the culturally advanced portions of Asia and the East Indies, and such parts of Africa as have come under Eur-Asiatic influence. It is significant that seven was devoid of special significance in ancient Egypt. This circumscribed distribution suggests diffusion from a single originating center. Where this may have been, there is no direct evidence to show, but there are indications that it lay in Babylonia. Here mathematics, astrology, and divination flourished at an early time. Since the art of foretelling the issue of events from examination of a victim's liver spread from Babylonia to Italy on one side and to Borneo on the other, it is the more likely that the equally ancient attribution of mystic virtue to seven may have undergone the same diffusion. In fact, the two practices may have traveled as part of a "complex." The Greeks and Hebrews are virtually out of question as originators because they were already thinking in terms of seven at a time when they were only receiving culture elements from Babylonia without giving anything in return.

123. Babylonian Discovery of the Planets

The Babylonians, together with the Egyptians, were also the first astronomers. The Egyptians turned their interest to the

seven lived either on the Atlantic slope, such as the Delaware and Cherokee, and have therefore long been in contact with the colonists; or in the Plains—notably the Siouan tribes—and there came into direct and indirect relations with the French for two hundred years before ethnologists visited them. Moreover, the number which the Plains tribes most frequently used in regard to sacred matters was four. The mystic value of seven may therefore be traceable to European influence wherever it appears in America.

sun and the year, and devised the earliest accurate solar calendar. The Babylonians lagged behind in this respect, adhering to a cumbersome lunar-solar calendar. But they acquired more information as to other heavenly phenomena: the phases of the moon, eclipses, the courses of the planets. They devised the zodiac and learned to half predict eclipses. It is true that their interest in these realms was not scientific in the modern sense, but sacerdotal and magical. An eclipse was a misfortune, an expected eclipse that did not "come off," a cause for rejoicing. Yet this superstitious interest did lead the Babylonians to genuine astronomical discoveries.

Among these was the observation that five luminaries besides the sun and moon move regularly across the heavens, visible to the naked eye and independent of the host of fixed stars: the planets that we call Mercury, Venus, Mars, Jupiter, and Saturn. This impressive fact must have significance, they felt, and from anthropocentric reasons they found the significance in the influence of these bodies on the fortunes of men. This was the beginning of astrology, which charlatans and dupes still practise among ourselves, but which in its youth represented one of the triumphs of civilized knowledge. The planets were identified with gods by the Babylonians, at any rate named after gods.

It is even probable that the ancient priest-astronomer-magicians were driven to distinguish the full set of observable planets by their desire to attain the full number seven. It is not an obvious thing by any means that the all-illuminating sun should be set on a par with moving stars that at times are no more conspicuous than some fixed ones. No people unaffected by the Babylonian precedent has ever hit upon the strange device of reckoning sun and moon as stars. Then, too, Mercury is perceptible with difficulty, on account of its proximity to the sun. It is said that great astronomers of a few centuries ago sometimes never in their lives saw this innermost of the planets with naked eye, at least in northern latitudes. It seems possible therefore that its Babylonian discovery may have been hastened by an eagerness to attain the perfect seven for the number of the traveling bodies.

124. GREEK AND EGYPTIAN CONTRIBUTIONS: THE ASTROLOGICAL COMBINATION

After the conquest of western Asia by Alexander, the Hellenistic Greeks took over the undifferentiated Babylonian astrology-astronomy and developed it into a science. They for the first time determined the distance or order of the seven luminaries from the earth, and determined it as correctly as was possible as long as it was assumed that our earth formed the center of the universe. Ptolemy—the astronomer, not the king—placed Saturn as the most outward, next Jupiter, Mars, Sun, Venus, Mercury, Moon.

This scientific advance, the west Asiatic astrologers again took hold of and brought into connection with the hours of the day. For this purpose they employed not the old Babylonian division of the day and night into twelve hours—which had long since passed over to the Greeks—but the Egyptian reckoning of twenty-four. This was possible because the Greek discoveries were made in the Egyptian city of Alexandria.

Each of the twenty-four hours in turn was assigned by the astrologers to a planet in the Ptolemaic order, beginning with Saturn. As there were only the seven, the cycle began over again on the eighth hour, and in the same way the fifteenth and twenty-second were "dominated" by Saturn. This gave the twenty-third to Jupiter, the twenty-fourth to Mars, and the twenty-fifth—the first of the next day, to the Sun. This second day was thought to be specially under the influence of the planet of its initial hour, the Sun, as the first was under the influence of its initial hour, that of Saturn. With the continuance of the count, the Moon would become dominant of the first hour of the third day, and so on through the repeated series, the remaining planets emerging in the sequence Mars, Mercury, Jupiter, Venus; whereupon, the cycle having been exhausted, it would begin all over again with Saturn's day—Saturday, as we still call it—and its successors Sun's day and Moon's day.

This was the week as we know it, evolved perhaps somewhat more than a century before Christ, soon carried back into Alexandria, and there imparted to Greeks, Romans, and other nationalities. By the time Jesus was preaching, knowledge of the planetary week had reached Rome. Less than a century later, its days were being written in Pompeii. In another hundred years it was spoken of by contemporaries as internationally familiar.

125. The Names of the Days and the Sabbath

As yet, however, the week was more of a plaything of the superstitious than a civil or religious institution; and it was pagan, not Christian. The names of the days were those of the gods which the Babylonians had assigned to the planets a thousand or more years earlier, or, in the Western world, "translations" of the Babylonian god names. The Greeks had long before, in naming the stars which we know as Mercury, Jupiter, Venus, substituted their Hermes, Zeus, Aphrodite for the Babylonian Nabu, Marduk, Ishtar, on the basis of some resemblance of attributes. Thus, Nabu had to do with learning or cunning like Hermes; Marduk, like Zeus, wielded thunder; Ishtar and Aphrodite were both goddesses of love. The Romans, in turn, "translated" the Greek names into those of their divinities Mercury, Jupiter, Venus, which survive for instance in French Mercre-di, Jeu-di, Vendre-di.

In the passing on of the week to the Germanic barbarians, still another "translation" was made, to Woden, Thor, Frija, whence English Wedn-es-day, Thur-s-day, Fri-day. It is true that these northern gods were not equivalents of the Roman ones, but that mattered little. The reckoning of the week was growing in frequency, and some sort of familiar and pronounceable names for its days had to be found for the new peoples to whom it spread. So a minimum of resemblance between two deities answered for an identification. Moreover, the ancients, because they believed in the reality of their gods but not in the infinity of their number, were in the habit of assuming that the deities of foreign nations must be at bottom the same as their own. Therefore a considerable discrepancy of attribute or worship troubled them no more than the difference in name.

For the days of the week, then, which the public came more and more to deal with, these translations were made. Astronomy, however, was in the hands of the learned, who knew

Latin; and hence scientists still denote the planets as Mercury, Venus, and so on, instead of Woden and Frija.

Jesus observed the Sabbath, not Sunday, which he was either ignorant of or would have denounced as polytheistic. The Sabbath was an old Hebrew institution, a day of abstention and cessation from labor, evidently connected with and perhaps derived from the Babylonian Shabattum. These shabattum were the seventh, fourteenth, twenty-first, twenty-eighth, and also nineteenth days of the month, the first four probably having reference to the phases of the moon, and all five being ''days of rest of the heart,'' inauspicious for undertakings, and therefore unfavorable for work. They were thus tabooed, supramundane days, and while their recurrence chiefly at seven day intervals, like that of the Jewish Sabbath, provided a sort of frame for a week, this week was never filled in. The influence of the Babylonian-Hebrew Sabbath on the development of the week was chiefly this: it provided the early Christians with a ready-made habit of religiously observing one day in seven. This period coinciding with the seven day scheme of the week that was coming into use among pagans, ultimately reinforced the week with the authority of the church.

126. The Week in Christianity, Islam, and Eastern Asia

Christianity however felt and long resisted the essential paganism of the week. The Roman Catholic church in its calendar recognizes the Lord's day, the second to sixth days, and the Sabbath, but none named after a heathen god. In Greece the influence of the Orthodox church has been strong enough to establish a similar numbering in civil life; and the Slavic nations, also mostly Orthodox, follow the same system except that our Monday is their ''first'' day and they close the week with Sunday.

Sunday, instead of Sabbath-Saturday, became the religious day of the week in Christianity because of the early tradition that it was on this day that Jesus rose from the dead. An unconscious motive of perhaps greater influence was the desire to differentiate the new religion from its Sabbath-observing mother religion, both in the minds of converts from Judaism and in the opinion of the pagans. The Romans for about a century confused Jews and Christians, no doubt to the irritation of both.

Meanwhile, the pagans themselves, perhaps under the influence of the popular sun-worshiping Mithraic religion of the second and third centuries, had come to look upon the Sun's day instead of Saturn's as the first of the week. At any rate, in 321 A.D. Constantine ordained "the venerable day of the Sun" as a legal holiday from governmental, civic, and industrial activity. Constantine perhaps issued this decree as high priest of the state religion of the Roman empire, but he was also the first Christian emperor, and his action must have been wholly acceptable to the church. Before long, church and state were in accord to discountenance work on Sunday; and thus Christianity had adopted the heathen planetary week in all respects but the names of its days. Protestantism finally withdrew even this barrier and accepted the planet-god names that had so long been popularly and civilly established.

The Mohammedan week is that of Judaism and Eastern Christianity, and was taken over bodily from one or the other of these religions. Sunday is the "first" day, and so in order to Thursday. Friday is "the meeting," when one prays at the mosque, but labors before and after, if one wishes. And Saturday is "the Sabbath," though of course without its Jewish prescriptions and restrictions. The Arabs have spread this form of the week far into Africa.

But the planetary week of Babylonian-Greek-Egyptian-Syrian origin spread east as well as west and north and south. It never became so charged with religious meaning nor so definitely established as a civil and economic institution in Asia as in Europe, but it was used astronomically, calendrically, and in divination. By the fifth century, it had been introduced into India. For a time after the tenth century, it was more used in dating than among European nations. Again "translations" of the god names of the planets were made: Brihaspati was Jupiter, and Brihaspati-vara Thursday.

From India, the week spread north into Tibet, east to the Indo-Chinese countries, and southeast to the Malay Peninsula, Sumatra, and Java. In the former lands, it was employed calendrically; among the Malaysians, rather astrologically, and has been largely superseded by the Mohammedan form. Even China acquired some slight acquaintance with the week as a period of seven days allotted to the planetary bodies and initiated by the day of Mit, that is, Mithra, the Persian sun god, although the average Chinaman knows nothing of the days of the week nor any periodic rest from labor.

127. Summary of the Diffusion

This history of the week is one of the striking instances of institutional diffusion. An ancient west Asiatic mystic valuation or magical cult of the number seven led on the one hand to an observance of taboo days, on the other to an association with the earliest astronomical knowledge, polytheistic worship, and divination. A European people learned the combination and built on it for further scientific progress, only to have this gain utilized for new playing by the astrologers. The planetary week, the creation of these mathematical diviners, was reintroduced into Europe and became connected with the calendar and civil life. Christianity recontributed the old idea of regularly recurring holy or taboo days. Mohammedanism took over this concept along with the period, but without the polytheistic and astrological elements. Eastern Asia, on the other hand, was chiefly interested in the latter. With us, the significance is becoming increasingly economic. Names have changed again and again, but their very variations evidence their equivalence. In about three thousand years from its first beginnings and half as many from its definitive establishment, the institution of the week by 1492 had spread over all the earth except the peripheral tracts of Asia and Africa and the peripheral continents of Oceania and America.

128. Month-thirds and Market Weeks

Contrasting with this single diffusion of the seven-day week is the independent development in several parts of the world of other periods, marked either by sacred or secularly unlucky days or by markets or by divisions of the lunar month.

For instance, a ten-day week, having reference to the beginning, middle, and end of the lunation, was more or less reckoned with in ancient Egypt; ancient Greece; parts of modern central Africa; China, Japan, and Indo-China; and Polynesia. No historic connections are known between the custom in these regions; its official and religious associations are everywhere slender, and intervening nations either employ other periods or none at all. It looks, therefore, as if these might be cases of true parallelism, although in that event an American occurrence might also be expected and its absence seems in need of explanation. Moreover there is nothing very important about this reckoning; it is essentially a description of a natural event, and the only thing distinctive is its being threefold. If an institution as precise and artificial as our planetary week had been independently originated more than once, the fact would be more significant.

Regular market days among agricultural peoples have frequently led to a reckoning of time superficially resembling the week. Thus, in central Africa, south of the sphere of Islamic influences, markets are observed by a considerable number of tribes. Most frequently these come at four day intervals. Some tribes shorten the period to three days or lengthen it to five. Six, eight, and ten day periods appear to be merely doublings. The fairly compact distribution of this African market week points to a single origin.

The early Romans observed a regular eighth day market and semi-holiday. This might be connected with the African institution, but as yet cannot be historically linked with it.

In the less advanced states of Indo-China and many of the East Indian islands, even as far as New Guinea, five-day markets are the rule. This entire tract has many internal culture connections, so that within its limits diffusion has evidently again been active.

In ancient America, markets were customary every fifth day in Mexico, third day in Colombia, tenth day in Peru. These were also days of assembly and cessation from labor.

The American instances establish beyond cavil that some of these market weeks are truly independent evolutions. Moreover, they nearly all occur among peoples of about the same degree of advancement, at any rate on the economic side of their cultures. But it is only the idea, the outline of the institution, that is similar; its concrete cultural execution, as expressed in the length of the period, differs in Asia and Africa, and in the three American regions. That the Mexican and Southeast Asiatic weeks were both of five days, means nothing but the sort of coincidence to be expected when the choice of duration is limited to a small range, such as between three and ten days.

129. Leap Days as Parallels

Finally, there is a correspondence between the Egyptians and Mexicans in recognizing the solar year as composed of 360 + 5 days. The Egyptians counted the 360 in twelve months of thirty days, the Mayas and Aztecs in eighteen groups of twenty days; both agreed in regarding the five leap days as supplementary and unlucky. This last fact looks like a close correspondence, but analysis dissolves much of the likeness. The solar year consists of 365 days and a fraction. There is nothing cultural about that phenomenon except its recognition. Careful observation continued for a long enough period inevitably yields the result. But 365 is indivisible except by 5 and 73; 360 is much "rounder," that is, divisible by many numbers, and these "simple" like 6, 10, 12, 18, 20, 30, and therefore easier to operate with. This again is a mathematical, not a cultural fact. The five supplementary days thus scarcely represent any distinctive achievement. As to their being considered unlucky and evil, that is unquestionably a true cultural parallel.

At the same time, this parallel cannot be enacted into any generally valid law. The ancient Hindu calendar, being directly lunar, had about twelve days left over each solar year end at the winter solstice. These twelve days were looked upon as prophetic and portentous, but not as specifically evil. The Persian and Armenian calendars, seemingly derived from the Egyptian, had the same five supplementary days. But in the former the first of its five is reckoned as lucky, only the third as unlucky; and in the latter, none of the five has any special value or observance. Our own twenty-ninth of February is supplementary and we hold a half serious belief or superstition in regard to it and its year, but this has nothing to do with luck.

In short, the human mind does tend to attach an unusual value to any day in the calendar that is in any way outstanding. This observation is a psychological one, and could be predicted from what is known of the principle of association in individual psychology. When it comes to the social expression of this tendency, regularity ceases. Sometimes the value of the special day is virtually identical among unconnected social groups, such as the Mayas and Egyptians; sometimes it is diverse, as between them and ourselves; and sometimes the value wholly disappears, as in Armenia. Parallelism in any matter of civilization is never complete and perfect, just as culture elements rarely spread far or long without modification.

CHAPTER XI

THE SPREAD OF THE ALPHABET

130. Kinds of writing: pictographic and mixed phonetic.—131. Deficiencies of transitional systems.—132. Abbreviation and conventionalization.—133. Presumptive origins of transitional systems.—134. Phonetic writing: the primitive Semitic alphabet.—135. The Greek alphabet: invention of the vowels.—136. Slowness of the invention.—137. The Roman alphabet.—138. Letters as numeral signs.—139. Reform in institutions.—140. The sixth and seventh letters.—141. The tail of the alphabet.—142. Capitals and minuscules.—143. Conservatism and rationalization.—144. Gothic.—145. Hebrew and Arabic.—146. The spread eastward: the writing of India.—147. Syllabic tendencies.—148. The East Indies: Philippine alphabets.—149. Northern Asia: the conflict of systems in Korea.

130. Kinds of Writing: Pictographic and Mixed Phonetic

Three stages are logically distinguishable in the development of writing. The first is the use of pictures of things and symbols of ideas: the pictographic method. In the second stage the representation of sounds begins, but is made through pictures or abbreviations of pictures: and pictures or ideographs as such continue to be used alongside the pictures whose value is phonetic. This may be called the mixed or transitional or rebus stage. Third is the phonetic phase. In this, the symbols used, whatever their origin may have been, no longer denote objects or ideas but are merely signs for sounds—words, syllables, or the elemental letter-sounds.

The first of these stages, the pictographic, and the degree to which it flows, or rather fails to flow spontaneously out of the human mind, have already been discussed (§ 105). The second or transitional stage makes use of the principle that pictures may either be interpreted directly as pictures or can be named. A picture or suggestive sketch of the organ of sight may stand for the thing itself, the eye. Or, the emphasis may be on the word eye, its sound; then the picture can be made with the purpose of representing that sound when it has a different meaning, as in the pronoun "I." The method is familiar to us in the form of the game which we call "rebus," that is, a method of writing "with things" or pictures of objects. The insect bee stands for the abstract verb "be," two strokes or the figure 2 for the preposition "to," a picture of a house with the sign of a tavern, that is an inn, for the prefix "in-," and so on. This charade-like method is cumbersome and indirect enough to provide the difficulty of interpretation that makes it fit for a game or puzzle. But what to us, who have a system of writing, is a mere sport or occasional toy, is also the method by which peoples without writing other than pure pictography made their first steps toward the writing of words and sounds. The principle of reading the name instead of the idea of the thing pictured is therefore a most important invention. It made possible the writing of pronouns, prepositions, prefixes and suffixes, grammatical endings, articles, and the like, which are incapable of representation by pictography alone. There is no difficulty drawing a recognizable picture of a man, and two or three such pictures might give the idea of men. But no picture system can express the difference between "a man" and "the man." Nor can relational or abstract ideas like those of "here," "that," "by," "of," "you," "why," be expressed by pictures.

131. Deficiencies of Transitional Systems

Important as the invention of the designation of words or sounds therefore was, it was at first hesitant, cumbersome, and incomplete as compared with modern alphabets. For one thing, many symbols were required. They had to be pictured with some accuracy to be recognizable. A picture of a bee must be made with some detail and care to be distinguishable with certainty from that of a fly or wasp or beetle. An inn must be drawn with its sign or shield or some clear identifying mark, else it is likely to be read as house or barn or hut or shop. The figure of the human eye is a more elaborate character than the letter I. Then, too, the old pictures did not go out of use. When the writing referred to bees and inns and eyes, pictures of these things were written and read as pictures. The result was that a picture of an eye would in one passage stand for the organ and in another for the personal pronoun. Which its meaning was, had to be guessed from the context. If the interpretation as pronoun fitted best—for instance, if the next characters meant ‘‘tell you’’—that interpretation was chosen; but if the next word were recognized to be ‘‘brow,’’ or ‘‘wink,’’ the character would be interpreted as denoting the sense organ. That is, the same characters were sometimes read by their sense and sometimes by their sound, once pictographically and once phonetically. Hence the system was really transitional or mixed, whereas a true alphabet, which represents sounds only, is unmixed or pure in principle. Owing to the paucity of sound signs at first, the object or idea signs had to be retained; after they were once well established, they continued to be kept alongside the sound signs even after these had grown numerous. The tenacity of most mixed systems is remarkable. The Egyptians early added word signs and then syllable and pure letter signs to their object signs. After they had evolved a set of letter signs for the principal sounds of their language, they might perfectly well have discarded all the rest of their hundreds of characters. But for three thousand years they clung to these, and wrote pictographic and phonetic characters jumbled together. They would even duplicate to make sure: as if we should write e-y-e and then follow with a picture of an eye, for fear, as it were, that the spelling out was not sufficiently clear. From our modern point of view it seems at first quite extraordinary that they should have continued to follow this plan a thousand years after nations with whom they were in contact, Phœnicians, Hebrews, Greeks, Romans, were using simple, brief, accurate, pure alphabets. Yet of course they were only following the grooves of crystallized habit, as when we write ‘‘weight’’ or ‘‘piece’’ with unnecessary letters, or employ a combination of two simple letters each having its own value, like T and H, to represent a third simple sound, that of TH. With us, as it was with the Egyptians, it would be more of a wrench and effort for the adult generation to change to new and simpler characters or methods than to continue in the old cumbersome habits. So the advantage of the next generation is stifled and the established awkward system goes on indefinitely.

132. Abbreviation and Conventionalization

This mixture of pictographic and ideographic with phonetic characters, and its long retention, were substantially as characteristic of Sumerian or Babylonian Cuneiform, of Chinese, and of Maya and Aztec writing, as of Egyptian. In all of these systems there was more or less tendency to abbreviate the pictures, to contract them to a few strokes, to reduce the original representations to conventional characters. Cuneiform and presumably Chinese underwent this process early and profoundly. In Egyptian it also set in and led to Hieratic and later to Demotic cursive script, which consist of signs that are meaningless to the eye, although they resolve into standardized reductions of the pictures which during the same period continued to be made in the monumental and religious Hieroglyphic. Such conventional abbreviations made possible a certain speed of production, rendered writing of use in business and daily life, and thereby contributed to the spread of literacy. In themselves, however, they introduced no new principle.

In addition to this conventionality of form of characters, there is to be distinguished also a conventionalization of meaning which is inherent in the nature of writing. Conventionalization of form accompanies frequency or rapidity of writing, conventionalization of meaning must occur if there is to be any writing at all. It develops in pure non-phonetic pictography if this is to be able to express any considerable range of meaning. An outstretched hand may well be used with the sense of "give." But the beholder of the picture-writing is likely to interpret it as "take." Here is where conventionalization is necessary: it must be understood by writers and readers alike that such a hand means "give" and not "take," or perhaps the reverse, or perhaps that if the palm is up and the fingers flat the meaning is "give" whereas the palm below or the fingers half closed means "take." Whatever the choice, it must be adhered to; the standardized, conventional element has entered. That is why one customarily speaks of "systems" of writing. Without the system, there can be not even picture-writing, but only pictures, whose range of power of communication is far more limited.

When the phonetic phase begins to be entered, conventionalization of meaning is even more important. An inn must be distinguished from a house by its shield, a house from a barn by its chimney, and so on. The shield will perhaps have to be exaggerated to be visible at all, be heart-shaped or circular to distinguish it from windows; and so forth. So with the phonetic values. A syllable like English ''per'' might be represented by one scribe by means of a cat with a wavy line issuing from its mouth to denote its *purr;* by another by a *pear;* by a third, by something that habitually came as a *pair,* such as earrings. Any of these combined with a ''sieve'' symbol would approximately render the work ''per-ceive.'' But some one else might hit upon the combination of a *purse* and the setting sun at *eve.* Obviously there has got to be a concordance of method if any one but the writer is to read his inscription readily. This correspondence of representation and interpretation is precisely what constitutes a set of figures into a system of writing instead of a puzzle.

133. Presumptive Origins of Mixed Systems

For such a set concordance to grow up among all the diverse classes of one large nation would be very difficult. In fact, it seems that transitional systems of writing have originated among small groups with common business or purpose, whose members were in touch with one another, and perhaps sufficiently provided with leisure to experiment: colleges of priests, government archivists, possibly merchants with accounts. It is also clear that any system must reflect the culture of the people among whom it originates. The ancient Egyptians had no inns nor purses, but did have horned serpents and owls. Still more determining is the influence of the language itself, as soon as writing attempts to be phonetic. The words expressing pair and sieve are obviously something else in Egyptian than in English, so that if these signs were used, their sound value would be quite otherwise. Yet once a system has crystallized, there is nothing to prevent a new nationality from taking it over bodily. The picture values of the signs can be wholly disregarded and their sounds read for words of a different meaning; or the sounds could be disregarded, or the original proper forms of the characters be pretty well obliterated, but their idea value carried over into the other tongue. Thus the Semitic Babylonians took the Cuneiform writing from the Sumerians, whose speech was distinct.

It is also well to distinguish between such cases of the whole or most of a system being taken over bodily, and other instances in which one people may have derived the generic idea of the method of writing from another and then worked out a system of its own. Thus it is hard not to believe in some sort of connection of stimulus between Egyptian and Cuneiform writing because they originated in the same part of the world almost simultaneously. Yet both the forms of the characters and their meaning and sound values differ so thoroughly in Egyptian and Cuneiform that no specific connection between them has been demonstrated, and it seems unlikely that one is a modified derivative form of the other. So with the hieroglyphs of the Hittites and Cretans. They appeared in near-by regions somewhat later. Consequently, although their forms are distinctive and, so far as can be judged without our being able to read these systems, their values also, it would be dogmatic to assert that the development of these two writings took place without any stimulation from Egyptian or Cuneiform. Something of a similar argument would perhaps apply even to Chinese (§ 251), though on this point extreme caution is necessary. Accordingly if one thinks of the invention of the first idea of part-phonetic writing, it is conceivable that all the ancient systems of the Old World derive from a single such invention; although even in that event the Maya-Aztec system would remain as a wholly separate growth. If on the other hand one has in mind the content and specific manner of systems of the transitional type, Egyptian, Cuneiform, and Chinese, perhaps also Cretan and Hittite, are certainly distinct and constitute so many instances of parallelism. Even greater is the number of independent starts if one considers pure pictographic systems, since tolerable beginnings of this type were made by the Indians of the United States, who never even attempted sound representations.

134. Phonetic Writing: the Primitive Semitic Alphabet

The last basic invention was that of purely phonetic writing —the expressing only of sounds, without admixture of pictures or symbols. Perhaps the most significant fact about this method as distinguished from earlier forms of writing is that it was invented only once in history. All the alphabetic systems which now prevail in nearly every part of the earth—Roman, Greek, Hebrew, Arabic, Indian, as well as many that have become extinct—can be traced back to a single source. The story in this case is therefore one of diffusion and modification instead of parallelism.

What circumstance it was that caused this all-important invention to be made, is not known, unfortunately, though time may yet bring knowledge. There is even division of opinion as to the particular system of mixed writing that was drawn upon by the first devisers of the alphabet, or that served as jumping off place for the invention. Some have looked to the Egyptian system, others to a Cuneiform or Cretan or Hittite source of inspiration. Nor is it wholly clear who were the precise people responsible for the invention. It is only certain that about 1,000 B.C., or a little earlier, some Semitic people of western Asia, in the region of the Hebrews and Phœnicians, probably the latter themselves, began to use a set of twenty-two non-pictorial characters that stood for nothing but sounds. Moreover, they represented the sounds of Semitic with sufficient accuracy for anything in the language to be written and read without trouble. These twenty-two letters look simple and insignificant alongside the numerous, beautiful, and interesting Egyptian hieroglyphs. But on them is based every form of alphabet ever used by humanity.

The earliest extant example of the primitive Semitic alphabet[1] is on the famous Moabite Stone of King Mesha, who in the ninth century before Christ erected and inscribed this monument to commemorate the successful defense of Moab against the invading Hebrews. Now Moab was a little and rude country, somewhat off the roads of commerce and civilization. It is hardly likely, therefore, that the Moabites were the inventors of the alphabet.

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[1] Except perhaps for the fragments of the Baal Lebanon bowl.

It is much more probable that the system was perfected, perhaps several centuries earlier, by a wealthier and more important people, one more in contact with foreign nations, such as the Phœnicians, and that from them it spread to their neighbors, the Hebrews, Moabites, and Aramæans of Syria. This spread must have been facilitated by the close kinship of the speech of these nations, enabling any of them to adopt the alphabet of another without material modification.

The Phœnicians founded Carthage, and consequently the Carthaginian or Punic writing until after the extinction of the great trading city was also Phœnician.

135. THE GREEK ALPHABET: INVENTION OF THE VOWELS

More important was the spread of the Phœnician letters to an entirely foreign people, the Greeks, whose language was largely composed of different sounds and possessed a genius distinct from that of the Semitic tongues. The Greeks' own traditions attest that they took over their alphabet from the Phœnicians. The fact of the transmission is corroborated by the form of the letters and by their order in the alphabet. It is also proved very prettily by the names of the letters. As we speak of the ABC, the Greeks spoke of the Alpha Beta—whence our word "alphabet." Now "alpha" and "beta" mean nothing in Greek. They are obviously foreign names. In the Semitic languages, however, similar names, Aleph and Beth, were used for the same letters A and B, and meant respectively "ox" and "house." Evidently these names were applied by the Semites because they employed the picture of an ox head to represent the first sound in the word Aleph, and the representation of a house to represent the sound of B in Beth. Or possibly the letters originated in some other way, and then, names for them being felt to be desirable, and the shape of the first rudely suggesting the outline of an ox's head and the second a house, these names were applied to the characters already in use.

The third letter of the alphabet, corresponding in place to our C and in sound to our G, the Greeks called Gamma, which is as meaningless as their Alpha and Beta. It is their corruption of Semitic Gimel, which means "camel" and may bear this name because of its resemblance to the head and neck of a camel. The same sort of correspondence can be traced through most of the remaining letters. From these names alone, then, even if nothing else were known about the early alphabets, it would be possible to prove the correctness of the Greek legend that they derived their letters from the Phœnicians. A people who themselves invented an alphabet would obviously name the letters with words in their own language, and not with meaningless syllables taken from a foreign speech.

The Greeks however did more than take over the alphabet from the Phœnicians. They improved it. An outstanding peculiarity of Semitic writing was that it dispensed with vowels. It represented the consonants fully and accurately, in fact had carefully devised letters for a number of breath and guttural sounds which European languages either do not contain or generally neglect to recognize. But, as if to compensate, the Semitic languages possess the distinctive trait of a great variability of vowels. When a verb is conjugated, when it is converted into a noun, and in other circumstances, the vowels change, only the consonants remaining the same, much as in English ''sing'' becomes ''sang'' in the past and ''goose'' changes to ''geese'' in the plural. Only, in English such changes are comparatively few, whereas in Semitic they are the overwhelming rule and quite intricate. The result of this fluidity of the vowels was that when the Semites invented their letters they renounced the attempt to write the vowels. Apparently they felt the consonants, the only permanent portions of their words, as a sort of skeleton, sufficient for an unmistakable outline. So, with their ordinary consonants, plus letters for J and V which at need could be made to stand for I and U, and the consistent employment of breaths and stops to indicate the presence or absence of vowels at the beginning and end of words, they managed to make their writing readily legible. It was as if we should write: *'n Gd w' trst* or *Ths wy 't.* Even to-day the Bible is written and read in the Jewish synagogue by this vowelless system of three thousand years ago.

In the Greek language more confusion would have been caused by this system. Moreover, the alphabet came to the Greeks as something extraneous, so that they were not under the same temptation as the Phœnicians to follow wholly in the footsteps of the first generation of inventors. As a result, the Greeks took the novel step of adding vowel letters.

It is significant that what the Greeks did was not to make the new vowel signs out of whole cloth, as it were, out of nothing, but that they followed the method which is characteristic of invention in general. They took over the existing system, twisted and stretched it as far as they could, and created outright only when they were forced to. While the Phœnician alphabet lacked vowel signs, the Greeks felt that it had a superfluity of signs for breaths and stops. So they transformed the Semitic breaths and stops into vowels. Thus they satisfied the needs of their language; and incidentally added the capstone to the alphabet. It was the first time that a system of writing had been brought on the complete basis of a letter for every sound. All subsequent European alphabets are merely modifications of the Greek one.

The first of the Semitic letters, the Aleph, stood for the glottal stop, a check or closure of the glottis in which the vocal cords are situated; a sound that occurs, although feebly, between the two o's in "coördinate" when one articulates distinctly. In the Semitic languages this glottal stop is frequent, vigorous, and etymologically important, wherefore the Semites treated it like any other consonant. The Greeks gave it a new value, that of the vowel A. Similarly they transformed the value of the symbols for two breath sounds, a mild and a harsh H, into short and long E, which they called Epsilon and Eta. Their O is made over from a Semitic guttural letter, while for I the Semitic ambiguous J-I was ready to hand. U, written Y by the Greeks, is a dissimilated variant of F, both being derived from Semitic Vau or the sixth letter with the value of V or U. The vocalic form was now put at the end of the alphabet, which previously had ended with T. Its consonantal double, F, later went out of use in Greek speech and was dropped from the alphabet.

136. SLOWNESS OF THE INVENTION

The Greeks did not make these alterations of value all at once. The value of several of the letters fluctuated in the different parts of Greece for two or three centuries. In one city a certain value or form of a letter would come into usage; in another, the same letter would be shaped differently, or stand for a consonant instead of a vowel. Thus the character H was long read by some of the Greeks as H, by others as long E. This fact illustrates the principle that the Greek alphabet was not an invention which leaped, complete and perfect, out of the brain of an individual genius, as inventions do in film plays and romantic novels, and as the popular mind, with its instinct for the dramatic, likes to believe. One might imagine that with the basic plan of the alphabet, and the majority of its symbols, provided ready-made by the Phœnicians, it would have been a simple matter for a single Greek to add the finishing touches and so shape his national system of writing as it has come down to us. In fact, however, these little finishing touches were several centuries in the making; the final result was a compromise between all sorts of experiments and beginnings. One can picture an entire nationality literally groping for generation after generation, and only slowly settling on the ultimate system. There must have been dozens of innovators who tried their hand at a modification of the value or form of a letter.

Nor can it be denied that what was new in the Greek alphabet was a true invention. The step of introducing full vowel characters was as definitely original and almost as important as any new progress in the history of civilization. Yet it is not even known who the first individual was that tried to apply this idea. Tradition is silent on the point. It is quite conceivable that the first writing of vowels may have been independently attempted by a number of individuals in different parts of Greece.

137. The Roman Alphabet

The Roman alphabet was derived from the Greek. But it is clear that it was not taken from the Greek alphabet after this had reached its final or classic form. If such had been the case, the Roman letters, such as we still use them, would undoubtedly be more similar to the Greek ones than they are, and certain discrepancies in the values of the letters, as well as in their order, would not have occurred. In the old days of writing, when a number of competing forms of the alphabet still flourished in the several Greek cities, one of these forms, developed at Chalcis on Eubœa and allied on the whole to those of the Western Hellenic world, was carried to Italy. There, after a further course of local diversification, one of its subvarieties became fixed in the usage of the inhabitants of the city of Rome. Now the Romans at this period still pronounced the sound H, which later became feeble in the Latin tongue and finally died out. On the other hand the distinction between short and long (or close and open) E, which the Greeks after many experiments came to recognize as important in their speech, was of no great moment in Latin. The result was that whereas classic Greek turned both the Semitic H's into E's, Latin accepted only the first of these modifications, that one affecting the fifth letter of the alphabet, whereas the other H, occupying the eighth place in the alphabetic series, continued to be used by the Romans with approximately its original Semitic value. This retention, however, was possible because Greek writing was still in a transitional, vacillating stage when it reached the Romans. The Western Greek form of the alphabet that was carried to Italy was still using the eighth letter as an H; so that the Romans were merely following their teachers. Had they based their letters on the ''classic'' Greek alphabet which was standardized a few hundred years later, the eighth as well as the fifth letter would have come to them with its vowel value crystallized. In that case the Romans would either have dispensed altogether with writing H, or would have invented a totally new sign for it and probably tacked it on to the end of the alphabet, as both they and the Greeks did in the case of several other letters.

The net result is the curious one that whereas the Roman alphabet is derived from the Greek, and therefore subsequent, it remains, in this particular matter of the eighth letter, nearer to the original Semitic alphabet.

There are other letters in the Roman alphabet which corroborate the fact of its being modeled on a system of the period when Greek writing still remained under the direct influence of Phœnician. The Semitic languages possessed two K sounds, usually called Kaph and Koph, or K and Q, of which the former was pronounced much like our K and the latter farther back toward the throat. The Greeks not having both these sounds kept the letter Kaph, which they called Kappa, and gradually discarded Koph or Koppa. Yet before its meaning had become entirely lost, they had carried it to Italy. There the Romans seized upon it to designate a variety of K which the Greek dialects did not possess, namely KW; which is of course the phonetic value which the symbol Q still has in English. The Romans were reasonable in this procedure, for in early Latin the Q was produced with the extreme rear of the tongue, much like the original Koph.

138. Letters as Numeral Signs

In later Greek, Koph remained only as a curious survival. Although not used as a letter, it was a number symbol. None of the ancients possessed pure numeral symbols of the type of our ''Arabic'' ones. The Semites and the Greeks employed the letters of the alphabet for this purpose, each letter having a numeral value dependent on its place in the alphabet. Thus A stood for 1, B for 2, C or Gamma for 3, F for 6, I for 10, K for 20 and so on. As this series became established, Q as a numeral denoted 90; the Greeks, long after they had ceased writing Q as a letter, used it with this arithmetical value. Once it had acquired a place in the series, it would have been far too confusing to drop. With Q omitted, R would have had to be shifted in its value from 100 to 90. One man would have continued to use R with its old value, while his more new-fashioned neighbor or son would have written it to denote ten less. Arithmetic would have been as thoroughly wrecked as if we should decide to drop out the figure 5 and write 6 whenever we meant 5, 7 to express 6, and so on. Habit in such cases is insuperable. No matter how awkward an established system becomes, it normally remains more practical to retain with its deficiencies than to replace by a better scheme. The wrench and cost of reformation are greater, or are felt to be greater by each generation, than the advantages to be gained.

139. Reform in Institutions

This is one reason why radical changes are so difficult to bring about in institutions. These are social and therefore in a sense arbitrary. In mechanical or ''practical'' matters people adjust themselves to the pressure of new conditions more quickly. If a nation has been in the habit of wearing clothing of wool, and this material becomes scarce and expensive, some attempt will indeed be made to increase the supply of wool, but if production fails to keep pace with the deficiency, cotton is substituted with little reluctance. If, on the other hand, a calendar becomes antiquated, which could be changed by a simple act of will, by the mere exercise of community reason, a tremendous resistance is encountered. Time and again nations have gone on with an antiquated or cumbersome calendar long after any mediocre mathematician or astronomer could have devised a better one. It is usually reserved for an autocratic potentate of undisputed authority, a Cæsar or a Pope, or for a cataclysm like the French and Russian revolutions, to institute the needed reform. As long as men are concerned with their bodily wants, those which they share with the lower animals, they appear sensible and adaptable. In proportion however as the alleged products of their intellects are involved, when one might most expect foresight and reason and cool calculation to be influential, societies seem swayed by a conservatism and stubbornness the strength of which looms greater as we examine history more deeply.

Of course, each nation and generation regards itself as the one exception. But irrationality is as easy to discern in modern institutions as in ancient alphabets, if one has a mind to see it. Daylight saving is an example very near home. For centuries the peoples of western civilization have gradually got out of bed, breakfasted, worked, dined, and gone to sleep later and later, until the middle of their waking day came at about two or three o'clock instead of noon. The beginning of the natural day was being spent in sleep, most relaxation taken at night. This was not from deliberate preference, but from a species of procrastination of which the majority were unintentionally guilty. Finally the wastefulness of the condition became evident. Every one was actually paying money for illumination which enabled him to sit in a room while he might have been amusing himself gratis outdoors. Really rational beings would have changed their habits—blown the factory whistle at seven instead of eight, opened the office at eight instead of nine, gone to the theater at seven and to bed at ten. But the herd impulse was too strong. The individual that departed from the custom of the mass would have been made to suffer. The first theater opening at seven would have played to empty chairs. The office closing at four would have lost the business of the last hour of the day without compensation from the empty hour prefixed at the beginning. The only way out was for every one to agree to a self-imposed fiction. So the nations that prided themselves most on their intelligence solemnly enacted that all clocks be set ahead. Next morning, every one had cheated himself into an hour of additional daylight, and the illuminating plant out of an hour of revenue, without any one having had to depart from established custom; which last was evidently the course actually to be avoided at all hazards.

Of course, most individual men and women are neither idiotic nor insane. The only conclusion is that as soon and as long as people live in relations and act in groups, something wholly irrational is imposed on them, something that is inherent in the very nature of society and civilization. There appears to be little or nothing that the individual can do in regard to this force except to refrain from adding to its irrationality the delusion that it is rational.

140. The Sixth and Seventh Letters

The letters, such as Q, in which the Roman alphabet is in agreement with the original Semitic one and differs from classic Greek writing, might lead, if taken by themselves, to the conjecture that the ancient Italians had perhaps not derived their alphabet via the Greeks at all, but directly from the Phœnicians. But this conclusion is untenable: first, because the forms of the earliest Latin and Greek letters are on the whole more similar to each other than to the contemporaneous Semitic forms; and second because of the deviations from the Semitic prototype which the Latin and Greek systems share with each other, as in the vowels.

The sixth letter of the Roman alphabet, F, the Semitic Waw or Vau, is wanting in classic Greek, although retained in certain early and provincial dialects. One of the brilliant discoveries of classical philology was that the speech in which the Homeric poems were originally composed still possessed this sound, numerous irregularities of scansion being explainable only on the basis of its original presence. The letter for it looked like two Greek G's, one set on top of the other. Hence, later when it had long gone out of use except as a numeral, it was called Di-gamma or "double-G."

The seventh Semitic letter, which in Greek finally became the sixth on account of the loss of the Vau or Digamma, was Zayin, Greek Zeta, our Z. This, in turn, the Romans omitted, because their language lacked the sound. They filled its place with G, which in Phœnician and Greek came in third position. The shift came about thus. The earliest Italic writing followed the Semitic and Greek original and had C, pronounced G, as its third letter. But in Etruscan the sounds K and G were hardly distinguished. K therefore went out of use; and the early Romans followed the precedent of their cultured and influential Etruscan neighbors. For a time, therefore, the single character C was employed for both G and K in Latin. Finally, about the third century before Christ, a differentiation being found desirable, the C was written as C when it stood for the "hard" or voiceless sound K, but with a small stroke, as G, when it represented the soft or voiced sound; and, the seventh place in the alphabet, that of Z, being vacant, this modified character was inserted. Thus original C, pronounced G, was split by the Latins into two similar letters, one retaining the shape and place in the alphabet of Gimel-Gamma, the other retaining the sound of Gamma but displacing Zeta.

But the letter Z did not remain permanently eliminated from western writing. As long as the Romans continued rude and self-sufficient, they had no need of a character for a sound which they did not speak. When they became powerful, expanded, touched Greek civilization, and borrowed from this its literature, philosophy, and arts, they took over also many Greek names and words. As Z occurred in these, they adopted the character. Yet to have put it in its original seventh place which was now occupied by G, would have disturbed the position of the following letters. It was obviously more convenient to hang this once rejected and now reinstated character on at the end of the alphabet; and there it is now.

141. The Tail of the Alphabet

In fact, the last six letters of our alphabet are additions of this sort. The original Semitic alphabet ended with T. U was differentiated by the Greeks from F to provide for one of their vowel sounds. This addition was made at an early enough period to be communicated to the Romans. This nation wrote U both for the vowel U and the consonantal or semi-vowel sound of our W. To be exact, they did not write U at all, but what we should call V, pronouncing it sometimes U and sometimes W. They spelled *cvm,* not *cum.*

Later, they added X. An old Semitic S-sound, in fifteenth place in the alphabet and distinct from the S in twenty-first position which is the original of our S, was used for both SS and KS. In classic Greek, one form, with KS value, maintained itself in its original place. In other early Græco-Italic alphabets, the second form, with SS value, kept fifteenth place and the X or KS variant was put at the end, after U. The SS letter later dropped out because it was not distinguished in pronunciation from S.

The Y that follows X is intrinsically nothing but the U which the Romans already had—a sort of double of it. The Greek U however was pronounced differently from the Latin one—like French U or German ü. The literary Roman felt that he could not adequately represent it in Greek words by his own U. He therefore took over the U as the Greeks wrote it—that is, a reduced V on top of a vertical stroke. This character naturally came to be known as Greek U; and in modern French Y is not simply called "Y," as in English, but "Y-grec," that is, "Greek Y."

With Z added to U (V), X, and Y, the ancient Roman alphabet was completed.

Our modern Roman alphabet is however still fuller. The two values which V had in Latin, that of the vowel U and the semi-vowel W, are so similar that no particular hardship was caused through their representation by the one character. But in the development of Latin from the classic period to mediæval times, the semi-vowel sound W came to be pronounced as the consonant V as we speak it in English. This change occurred both in Latin in its survival as a religious and literary tongue, and in the popularly spoken Romance languages, like French and Italian, that sprang out of Latin. Finally it was felt that the full vowel U and the pure consonant V were so different that separate letters for them would be convenient. The two forms with rounded and pointed bottom were already actually in use as mere calligraphic variants, although not distinguished in sound, V being usually written at the beginning of words, U in the middle. Not until after the tenth century did the custom slowly and undesignedly take root of using the pointed letter exclusively for the consonant, which happened to come most frequently at the head of words, and the rounded letter for the vowel which was commoner medially.

In the same way I and J were originally one letter. In the original Semitic this stood for the semi-vowel J (or "Y" as in yet); in Greek for the vowel I; in Latin indifferently for vowel or semi-vowel, as in Ianuarius. Later, however, in English, French, and Spanish speech, the semi-vowel became a consonant just as V had become. When differentiation between I as vowel and as consonant seemed necessary, it was effected by seizing upon a distinction in form which had originated merely as a calligraphic flourish. About the fifteenth century, I was given a round turn to the left, when at the beginning of words, as an ornamental initial. The distinction in sound value came still later. The forms I and J were kept together in the alphabet, as U and V had been, the juxtaposition serving as a memento of their recency of distinction—like the useless dot over small j. Had the people of the Middle Ages still been using the letters of the alphabet for numerical figures as did the Greeks, they would undoubtedly have found it more convenient to keep the order of the old letters intact. J and U would in that case almost certainly have been put at the end of the alphabet instead of adjacent to I and V.

J presents a survival—a significant anachronism. Although now recognized in the alphabet, the letter is not always accorded its full place in the series; now and then it is treated like an adopted child whose position in the family is somewhat subsidiary. When a continental European uses letters to designate rows of chairs in a theater, paragraph headings in a book, a series of shipping marks, or any other listing, he often omits J, passing directly from I to K as a Roman of two thousand years ago would have done. Americans occasionally do the same: in Washington, K street follows directly on I street. If asked the reason, we perhaps rationalize the omission on the ground that I and J look so much alike that they run risk of being confused. Yet it scarcely occurs to us that I and L, or I and T, can also be easily confused. The true cause of the habit seems to be the unconscious one that our ancestors, in using the letters seriatim, followed I by K because they had no J.

The origin of W is accounted for by its name, "Double-U," and by its form, which is that of two V's. The old Latin pronunciation of V gradually changed from W to V, and many of the later European languages either contained no W-sound or indicated it by the device of writing U or some combination into which U entered. Thus the French write OU and the Spanish HU for the sound of W. In English, however, and in a few other European languages, the semi-vowel sound was important enough to make a less circumstantial representation advisable. Since the sound of the semi-vowel was felt to be fuller than that of the consonant, a new letter was coined for the former by coupling together two of the latter. This innovation did not begin to creep into English until the eleventh century. Being an outgrowth of U and V, W was inserted after them as J was after I. It is a slight but interesting instance of convergence that its name is exactly parallel to the name "Double Gamma" which the Greek grammarians coined for F long before.

142. Capitals and Minuscules

The distinction between capitals and "small" letters is one which we learn so early in life that we are wont to take it as something self-evident and natural. Yet it is a late addition in the history of the alphabet. Greeks and Romans knew nothing of it. They wrote wholly in what we should call capital letters. If they wanted a title or heading to stand out, they made the letters larger, but not different in form. The same is done to-day in Hebrew and Arabic, and in fact in all aphabets except those of Europe.

Our own two kinds or fonts of letters, the capital and "lower case" or "minuscule," are more different than we ordinarily realize. We have seen them both so often in the same words that we are likely to forget that the "A" differs even more in form than in size from "a," and that "b" has wholly lost the upper of the two loops which mark "B." In late Imperial Roman times the original "capital" forms of the letters were retained for inscriptional purposes, but in ordinary writing changes began to creep in. These modifications increased in the Middle Ages, giving rise first to the "Uncial" and then to the "Minuscule" forms of the letters. Both represent a cursive rather than a formal script. The minuscules are essentially the modern "small" letters. But when they first developed, people wrote wholly in them, reserving the older formal capitals for chapter initials. Later, the capitals crept out of their temporary rarity and came to head paragraphs, sentences, proper names, and in fact all words that seemed important. Even as late as a few centuries ago, every English noun was written and printed with a capital letter, as it still is in German. Of course little or nothing was gained by this procedure. In many sentences the significant word must be a verb or adjective; and yet, according to the arbitrary old rule, it was the noun that was made to stand out.

To-day we still feel it necessary in English to retain capitals for proper names. It is certain that a suggestion to commence these also with small letters would be met with the objection that a loss of clearness would be entailed. As a matter of fact, the cases in which ambiguity between a common and proper noun might ensue would be exceedingly few; the occasional inconvenience so caused would be more than compensated for by increased simplicity of writing and printing. Every child would learn its letters in little more than half the time that it requires now. The printer would be able to operate with half as many characters, and typewriting machines could dispense with a shift key. French and Spanish designate proper adjectives without capitals and encounter no misunderstanding, and all English telegrams are sent in a code that makes no distinction. When we read the newspaper in the morning and think that the mixture of capital and small letters is necessary for our easy comprehension of the page, we forget that this same news came over the wire without capitals.

143. Conservatism and Rationalization

The fact is that we have become so habituated to the existing method that a departure from it might temporarily be a bit disconcerting. Consequently we rationalize our cumbersome habit, taking for granted or explaining that this custom is intrinsically and logically best; although a moment s objective reflection suffices to show that the system we are so addicted to costs each of us, and will cost the next generation, time, energy, and money without bringing substantial compensation.

It is true that this waste is distributed through our lives in small driblets, and therefore is something that can be borne without seeming inconvenience. Civilization undoubtedly can continue to thrive even while it adheres to the antiquated and jumbling method of mixing two kinds of letters where one is sufficient. Yet the practice illustrates the principle that the most civilized as the most savage nations assert and believe that they adhere to their institutions after an impartial consideration of all alternatives and in full exercise of wisdom, whereas analysis regularly reveals them as astonishingly resistive to alteration whether for better or worse.

If our capital letters had been purposely superadded to the small ones as a means of distinguishing certain kinds of words, a modern claim that they were needed for this purpose could perhaps be accepted. But since the history of the alphabet shows that the capital letters are the earlier ones, that the small letters were for centuries used alone, and that systems of writing have operated and operate without the distinction, it is clear that utility cannot be the true motive. The employment of capital letters as initials originated in a desire for ornamentation. It is an embroidery, the result of a play of the æsthetic sense. It is the use of capitals that has caused the false sense of their need, not necessity that has led to their use.

144. GOTHIC

Another exemplification of how tenaciously men cling to the accustomed at the expense of efficiency, is provided by the "Black-Letter" or "Gothic" alphabet used in Germany and Scandinavia. This is nothing but the Roman letters as elaborated by the manuscript-copying monks of northern Europe toward the end of the Middle Ages, when a book was as much a work of art as a volume of reading matter. The sharp angles, double connecting strokes, goose-quill flourishes, and other increments of the Gothic letters undoubtedly possess a decorative effect, although an over-elaborate one. They were evolved in a period when a copyist cheerfully lettered for a year in producing a volume, and the lord or bishop into whose hands it passed was as likely to turn the leaves in admiration of the black and red characters as to spend time in reading them.

When printing was introduced, the first types were the intricate and angular Gothic ones customary in Germany. The Italians, who had always been half-hearted about the Gothic forms, soon revolted. Under the influence of the Renaissance and its renewed inspiration from classical antiquity, they reverted as far as possible to the ancient shapes of the characters. Even the mediæval small letters were simplified and rounded as much as possible to bring them into accord with the old Roman style. From Italy these types spread to France and most other European countries, including England, which for the first fifty years had printed in Black-Letter. Only in north central Europe did the Gothic forms continue to prevail, although even there all scientific books have for some time been printed in the Roman alphabet. Yet Germans sometimes complain of the "difficulty" of the Roman letters, and books intended for popular sale, and newspapers, go into Gothic. There can be little doubt that in time the Roman letters will dispossess the Gothic ones in Germany and Scandinavia except for ornamental display heads. But the established ways die hard; Gothic let-

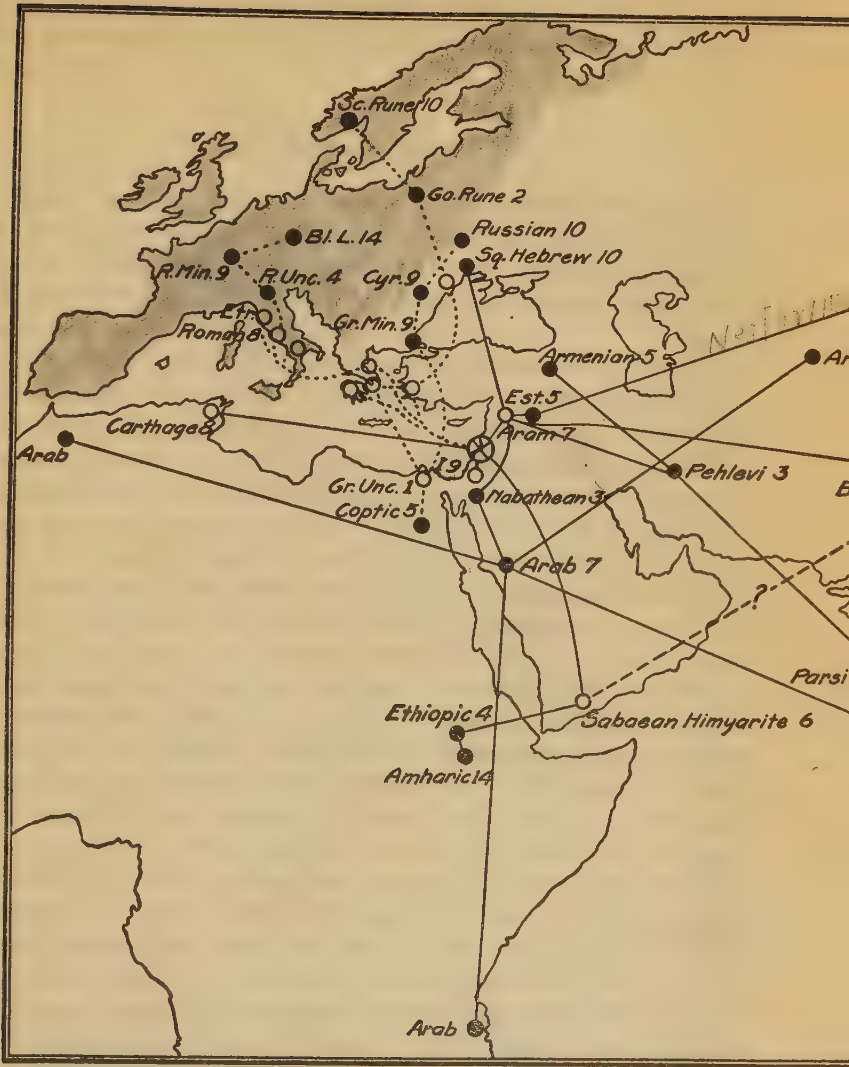

FIG. 30. The spread of alphabetic writing. Course of Occidental alphabet
lines. The numbers stand for centuries: with hollow circles, before Christ; w
Phœnicia, 11th century B.C. *Abbreviations:* Aram, Aramæan; Bl L, Black
Go, Gothic (Runes); Gr Min, Unc, Greek Minuscule, Uncial; In Ba, Indo-Bac
Uncial; Sc, Scandinavian (Rune). The flow was often back and fourth; co
Athens to Alexandria (Uncial) to Constantinople (Minuscule) to Russian; or
bathean and Arabic, east to Pehlevi and back west to Armenian.

ters may linger on as the "old-style" calendar with its eleven-day belatedness held out in England until 1752 and in Russia until 1917.

145. Hebrew and Arabic

Only a small part of the history of the alphabet was unfolded in Europe, where the seemingly so different forms of writing that have been discussed are after all only fairly close variants of the early Greek letters. In Asia the alphabet underwent more profound changes.

The chief modern Semitic alphabets, Hebrew and Arabic, are considerably more altered from the primitive Semitic or Phœnician than is our own alphabet. The Hebrew letters were slowly evolved, during the first ten centuries after Christ, under influences which have turned most of them as nearly as possible into parts of squarish boxes. B and K, M and S, G and N, H and CH and T, D and V and Z and R are shaped as if with intent to look alike rather than different. Arabic, on the other hand, runs wholly to curves: circles, segments of circles, and round flourishes; and several of its letters have become identical except for diacritical marks. If we put side by side the corresponding primitive Semitic, the modern English, the Hebrew, and the Arabic letters, it is at once apparent that in most cases English observes most faithfully the 3,000-years old forms. The cause of these changes in Hebrew and Arabic is in the main their derivation from alphabets descended from the Aramæan alphabet, a form of script that grew up during the seventh century B.C. in Aram to the northeast of Phœnicia. The Aramæans were Semites and therefore kept to the original value of the Phœnician letters more closely than the Greeks and Romans. On the other hand, they employed the alphabet primarily for business purposes and rapidly altered it to a cursive form, in which the looped or enclosing letters like A, B, D were opened and the way was cleared for a series of increasing modifications. Greek and Roman writing, on the other hand, were at first used largely in monumental, dedicatory, legal, and religious connections, and preserved clarity of form at the expense of rapidity of production.

One feature of primitive Semitic, most Asiatic alphabets retained for a long time: the lack of vowel signs. In the end, however, representation of the vowels proved to be so advantageous that it was introduced. Yet the later Semites did not follow the Greek example of converting dispensable consonantal signs into vocalic ones. They continued to recognize consonant signs as the only real letters, and then added smaller marks, or "points" as they are called, for the vowels. These points correspond more or less to the grave, acute, and circumflex accents which French uses to distinguish vowel shades or qualities, é, è, ê, and e, for instance; and to the double dot or diæresis which German puts upon its "umlaut" vowels, as to distinguish ä (= e) from a. There is this difference, however: whereas European points are reserved for minor modifications, Hebrew and Arabic have no other means of representing vowels than these points. The vowels therefore remain definitely subsidiary to the consonants; to the extent of this deficiency Hebrew has adhered more closely to the primitive Semitic system than have we.

The reason for this difference lies probably in the fact that Hebrew and Arabic have retained virtually all the consonants of ancient Semitic. Hence the breaths and stops could not be dispensed with, or at least such was the feeling of their speakers. In the Indo-European languages, these sounds being wanting, the transformation of the superfluous signs into the letters needed for the vowels was suggested to the Greeks. The step perfecting the alphabet was therefore taken by them not so much because they possessed originality or specially fertile imagination, as because of the accident that their speech consisted of sounds considerably different from those of Semitic. Perhaps the Greeks once complained of the unfitness of the Phœnician alphabet, and adjusted it to their language with grumblings. Had they been able to take it over unmodified, as the Hebrews and Arabs were able, it is probable that they would cheerfully have done so with all its imperfection. In that case they, and after them the Romans, and perhaps we too, would very likely have gone on writing only consonants as full letters and representing vowels by the Semitic method of subsidiary points. In short, even so enterprising and innovating a people as the Greeks are generally reputed to have been, made their important contribution to the alphabet less because they wished to improve it than because an accident of phonetics led them to find the means. Such are the marvels of human invention when divested of their romantic halo and examined objectively.

146. The Spread Eastward: the Writing of India

The diffusion of the alphabet eastward from its point of origin was even greater than its spread through Europe. Most of this extension in Asia is comprised in two great streams. One of these followed the southern edge of the continent. This was a movement that began some centuries before Christ, and often followed water routes. The second flow was mainly post-Christian and affected chiefly the inland peoples of central Asia.

India is the country of most importance in the development of the south Asiatic alphabets. The forms of the Sanskrit letters show that they and the subsequent Hindu alphabets are derivatives, though much altered ones, from the primitive Semitic writing. Exactly how the alphabet was carried from the shore of the Mediterranean to India has not been fully determined. By some the prototype of the principal earliest Indian form of writing is thought to have been the alphabet of the south Arabian Sabæans or Himyarites of five or six hundred years B.C. As the Arabs were Semites, and as there was a certain amount of commerce up and down the Red Sea, it is not surprising that even these rather remote and backward people had taken up writing. Between south Arabia and India there was also some intercourse, so that a further transmission by sea seems possible enough. Another view is that Hindu traders learned and imported a north Semitic alphabet perhaps as early as during the seventh century, from which the Brahmi was made over, from which in turn all living Indian alphabets are derived. Besides this main importation, there was another, from Aramæan sources, which gave rise to a different form of Hindu writing, the Kharoshthi or Indo-Bactrian of the Punjab, which spread for a time into Turkistan but soon died out in India.

147. Syllabic Tendencies

One trait of Indian alphabets leads back to their direct Semitic origin: they did not recognize the vowels. The Hindus speaking Indo-European were confronted with the same difficulty as the Greeks when they took over the vowelless Semitic alphabet. But they solved the difficulty in their own way. They assumed that a consonantal letter stood for a consonant plus a vowel. Thus, each letter was really the sign for a syllable. The most common vowel in Sanskrit being A, this was assumed as being inherent in the consonant. For instance, their letter for K was not read K, but KA. This meant that when K was to be read merely as K, it had to be specially designated: something had to be done to take away the vowel A. A diacritical sign was added, known as the virama. This negative sign is a "point" just as much as the positive vowel points of Hebrew; but was used to denote exactly the opposite.

There are of course other vowels than A in Sanskrit. These were represented by diacritical marks analogous to the virama. Thus while this is a diagonal stroke below the consonant, U is represented by a small curve below, E by a backward curve above, AI by two such, and so on.

If a syllable had two consonants before the vowel, these were condensed into one, the essential parts of each being combined into a more complex character. This was much as if we were to write "try" by forcing t and r into a special character showing the cross stroke of the t and the roll or hook of the r, and superposing a diæresis for the vowel. This process reduced every syllable to a single though often compound letter. If the syllable ended in a consonant, this carried over as the beginning of the next syllable. Even the end consonant of a word was written as the first letter of the next. According to the Sanskrit plan, "the dog is mad" would be rendered "the do gi sma d-."

Obviously, there is something unnaturally regular, a systematic artificiality, about such a scheme. Love of system cropped out otherwise. The Hindus devised a new symbol—mainly by differentiation of old ones—for every sound that they had and Semitic lacked. Thus they doubled the number of their letters. Then they rearranged their order on a phonetic and logical basis. All sounds made against the back palate were brought into one group; those formed against the fore-palate, gums, and teeth came after; the lip sounds last. Within each of the groups the letters followed one another in a fixed order according to their method of production—voiceless stops always first, nasals always last.

The result of these innovations was that the Hindu alphabets diverged much more from the Semitic original than did ours. This perhaps was really to be expected, since writing entered India by long leaps between peoples that were not in intimate relations. Also, by the time the alphabet first reached them, the Hindus, in the isolation of their remote peninsula, had already worked out an advanced and unique type of civilization. This fact must have predisposed them to make over any imported invention in conformity with their established habits.

148. The East Indies: Philippine Alphabets

The spread of the Hindu alphabet within India, over southeastern Asia, and into the East Indian archipelago, cannot be followed here because it is an intricate story, interwoven with the history of Brahmanism and Buddhism. It may be said that in general, with the chief exception of China, Hindu writing followed where Hindu religion penetrated. But it may be illuminating to touch briefly on one of the extensions.

In the early centuries after Christ, Hindus began to reach the East Indies, especially Sumatra and Java. Here they established principalities or kingdoms and their religion. Many arts were also imported by them, such as iron working, batik dyeing, sculpture, drama, and writing. From perhaps the sixth to the fifteenth centuries, the Malaysian population of Java lived under a heavy layer of Hindu culture (§ 104, 126, 262), and literacy evidently became fairly widespread. Greater or less portions of this culture were transported to the other East Indian islands and with them went writing. In the Philippines, the Spaniards of the sixteenth century found several related alphabets, one to each of the principal nationalities, which seem derived from Bengal some eight hundred years before.

The Malayan languages are unusually simple in their array of sounds. Hence the greater part of the elaborate Sanskrit alphabet was discarded by them. But the salient characteristics of Sanskrit writing were retained. A consonant was read as consonant plus A. Points were provided if the consonant was to be read with other vowels. Of such points, the Philippine alphabets employed only two. One, put above the consonant, served indiscriminately for I and E, the other, below, for U and O. The position of the points connects them with the Sanskrit vowel signs. In this way the Philippine languages were adequately rendered with a set of about twelve consonantal letters, three for the independent vowels, and two vowel points.

At the time of the Spanish discovery, the native Philippine alphabets were already meeting Arabic writing, which had shortly before been introduced in the southern islands with Mohammedanism. The Spaniards of course brought the Roman alphabet. Under this double competition the use of native writing soon began to decay. The most advanced of the Filipino nationalities, such as the Tagalog and Bisaya, have long since given up their old letters. Yet it has recently been discovered that two varieties of the native writing still survive—both of them among backward tribes: the Tagbanua of Palawan and the Mangyan of Mindoro. Here in the jungle, among half clothed savages living under rude thatches and without firearms or government, the remotest descendants of the ancient Sanskrit alphabet linger.

Three widely different descendants of the primitive Semitic alphabet have therefore met in this archipelago. One, beginning its journey some twenty-five hundred years ago, traveled via Arabia and northern India, probably reaching the Philippines by 800 A.D. The second evolved in the Semitic homeland, finally poured out of northern Arabia with Mohammedanism, was carried across India to the Malay Peninsula, and thence leaped across the sea to Borneo and the Philippines about 1,400 A.D. The third followed the longest journey: from the Phœnicians to the Greeks, to southern Italy, to Rome, to Spain, and, after Columbus, to Mexico, and then across the Pacific ocean to Manila shortly before A.D. 1,600.

149. Northern Asia: the Conflict of Systems in Korea

The history of the central and north Asiatic alphabets is complex. It may be summed up in the statement that Aramæan derivatives of the primitive Semitic writing, evolving in and near Syria, in the six or seven centuries before the birth of Christ, were carried east and northeast from one people to another. One of the modifications of Aramæan, the Estrangelo Syriac, was transported by a sect of heretical Christians, the Nestorians, to the Uigurs and Mongols, from whom the Manchus derived their system.

The farthest extension of the alphabet in Asia was to the shores of the Pacific ocean, in Korea. Korean writing however seems to be derived from an Indian source, through Tibetan or perhaps Pali, the sacred language and script of the Southern branch of Buddhism; hence to be only a remote collateral relative of the neighboring Manchu. In Korea, the spread of the alphabet was checked, not through any inherent flaws or weakness of age, but by the competition of a totally different system of writing: that of the Chinese.

Chinese writing is not alphabetic at all. To some extent it does represent sounds. But it represents syllables or words, not letters; and it represents them by the rebus method. The basis of Chinese writing is ideographic. It is therefore a modified form of picture writing, and theoretically pertains to an early stage, almost comparable in principle to Egyptian hieroglyphs.

In a conflict between such a primitive system and a truly alphabetic one, the latter should of course prevail on account of its much greater efficiency and simplicity. Actually, however, the Korean alphabet did not triumph but barely managed to maintain an existence alongside Chinese. The cause was a familiar one: the tremendous social conservatism of the human mind.

When the native alphabet obtained its hold in Korea, it was confronted by an overwhelming Chinese influence. The court, the government, the institutions, official religion, all activities of people of fashion and importance, were modeled after Chinese examples. The man who could not write and read Chinese characters was eliminated from polite society and advancement. This was only natural. The civilization of China is one of the most ancient and greatest in the world, and the Koreans were a smaller people and close neighbors. Western civilization was thousands of miles away, and it was only now and then that a driblet from it penetrated to the eastern edge of Asia. On one side then stood the undoubted practical advantage of the alphabet from the West; on the other, the momentum of the whole mass of Chinese culture. The outcome was that the nationally Korean and true alphabet became something that shopkeepers and low people made use of; a thing easy to learn and more or less contemptible. But laws and documents and books of higher learning were written in Chinese characters, which innumerable Koreans for generation after generation spent years of their lives in mastering.

If the human mind were really rational, if it operated rationally only a tenth as much as it fondly believes, it would not do awkward and difficult things after a simpler and more effective means to the same end had been put within its reach, as was the case in this Korean situation. Another principle beyond mere outright inertia is operative here. This is the tendency of culture elements which have for some time been associated, often only by accident, to form an interlocked aggregation or "complex." Once such a complex or cluster has acquired a certain coherence, it survives with a tenacity independent of the degree of inherent or logical connection between its elements. The fact that ideographs were associated with Chinese religion, literature, and institutions, constituted them part of what may be called the Chinese complex. The mass of this Chinese complex far overbalanced the slight and scattering Western influences. The alphabet drifted into Korea as an isolated fragment, and was promptly borne down by the weight of the elaborate and closely knit culture aggregate of Chinese origin. This brute fact, and not any superior reasonableness or intrinsic merit of one system or the other, determined the issue between them.

In the same way the "complex" that we know as Western civilization—Christianity and collars, science and picture films, factory labor and democracy, fine and base all tangled together—is to-day crushing the breath out of ancient and exotic cultures. We like to call the process "Progress" because that is more comforting than to view it as the rolling of a fate beyond our control.

CHAPTER XII

THE GROWTH OF A PRIMITIVE RELIGION

150. Regional variation of culture.—151. Plains, Southwest, Northwest areas.—152. California and its sub-areas.—153. The shaping of a problem.—154. Girls' Adolescence Rite.—155. The First Period.—156. The Second Period: Mourning Anniversary and First-salmon rite.—157. Era of regional differentiation.—158. Third and Fourth Periods in Central California: Kuksu and Hesi.—159. Third and Fourth Periods in Southern California: Jimsonweed and Chungichnish.—160. Third and Fourth Periods on the Lower Colorado: Dream Singing.—161. Northwestern California: world-renewal and wealth display.—162. Summary of religious development.—163. Other phases of culture.—164. Outline of the culture history of California.—165. The question of dating.—166. The evidence of archæology.—167. Age of the shellmounds.—168. General serviceability of the method.

150. Regional Variation of Culture

As one first becomes acquainted with a totally strange people spread over a large area, such as the Indians of North America, they are likely to seem rather uniform. The distinctions between individual and individual, and even the greater distinctions between one group and another, become buried under the overwhelming mass-effect of their difference from ourselves. Growing familiarity, however, renders individual, local, and tribal peculiarities plainer. The specialist, finally, comes to concern himself with particular traits until the peculiarities occupy more of his attention than the uniformities. His danger always is to let himself get into the habit of taking sweeping similarities so much for granted that he ends by underemphasizing or forgetting them. At the same time his business is to add something new to human understanding—facts at any rate, interpretation if possible. Generalities are likely to be pretty widely known, and progress, new formulations, therefore depend ultimately on mastery of detail. This means that if a scientist is to contribute anything to the world's comprehension, is to add a new mental tool to its chest, he must devote himself to specific traits, to discriminations of fine detail. It is only by finding new trees that he helps to make the woods larger.

If then we approach a race like the American Indians with the scientist's or student's purpose of discovering something more than we already know, we quickly find that institutions, customs, and utensils, in other words the cultures, vary from tribe to tribe. When one compares tribes living so far apart as to be no longer united in intercourse, nor even by communication with common intermediaries, there is scarcely a trait in which their cultures are wholly identical. Within a limited district a fair degree of uniformity is found to prevail. Yet when the boundaries of such an area are crossed, a new type of culture begins to be encountered, which again holds with local variations until a third district is entered.

151. PLAINS, SOUTHWEST, NORTHWEST AREAS

For instance, the Indians of the Plains between the Rocky mountains and the Mississippi river form a comparative unit. They are all warlike, the great aim in life of every man in these tribes being attainment of military glory. All the Plains tribes subsisted to a large extent on buffalo, lived in tipis—tents made of buffalo skins—and boiled their food with hot stones in buffalo rawhide. Nearly all of them performed a four days' religious ceremony known as the Sun Dance, of which one of the outstanding acts was fasting and sometimes self-torture inflicted with skewers drawn through the skin and torn out. These customs were common to the Sioux, Cheyenne, Arapaho, Crow, Blackfeet, Assiniboine, Omaha, Kiowa, Comanche, and other tribes.

As one passes from this region to the mountainous plateau which constitutes the present New Mexico and Arizona—the Southwest of the United States—one encounters a series of tribes often inhabiting stone houses, subsisting by agriculture, cooking in earthenware pots, little given to fighting, according authority to priests rather than warriors, erecting altars, and performing masked dances representing divinities. This Southwestern culture, its internal relations, and the tribes participating in it, have already been discussed in another connection (§ 87).

If, however, on leaving the Plains one turns northwest to the shores of British Columbia and southern Alaska, a third distinctive type of native civilization appears. Among these Northwestern or North Pacific Coast tribes, such as the Tlingit, Haida, Tsimshian, Kwakiutl, Nutka, and Salish, the priest as well as the warrior bowed before the rich man, an elaborate set of rules and honors separating the wealthy high-born from the poor and lowly. Aristocracy, commoners, and slaves made up distinct strata of society in this region. Public rituals were occasions for the ostentation of wealth. Houses were carpentered of wood. Cooking was done in boxes. The prevalent food was fish.

The significant thing is that these are not three tribes, but three groups each consisting of a number of politically independent tribes spread over a considerable territory and evincing a fairly fundamental similarity of customs and institutions. We are confronting three kinds of culture, each super-tribal in range and attached to a certain area. These areas have sometimes been called "ethnographic provinces"; they are generally known as "culture-areas." Of such areas ten are generally recognized on the North American continent. These are the Plains, Southwest, North Pacific Coast, Mackenzie-Yukon, Arctic, Plateau, California, Northeast, Southeast, and Mexico.[1]

Obviously we have here a classification comparable to that which the naturalist makes of animals. As the zoölogist divides the vertebrate animals into mammals, birds, reptiles, amphibians, and fishes, so the anthropologist divides the generic North American Indian culture into the cultures of these ten areas. The naturalist however cannot stop with a group as inclusive as the mammals, and goes on to subdivide them into orders, such as the rodents, carnivores, ungulates, and the like. Each of these again he goes on splitting into families, genera, and finally species. The species correspond to the smallest groups in human society, namely the tribes or nations. Parallel to the family or order which the naturalist finds between a particular species and the great class of mammals, one may therefore expect to discover groups intermediate between particular tribes and the large culture-areas. Such intermediate groups would consist of clusters of tribes constituting fractions of a culture-area: clearly pertaining to this area, but yet somewhat set off from other clusters within the same area—like the Pueblos and Navaho within the Southwest, as already described (§ 87). We may call such clusters or fractions sub-culture-areas, and must concern ourselves with them if we desire to deepen our understanding of aboriginal American civilization.

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[1] These areas are discussed further in the next chapter, especially in § 174.

For the sake of simplicity, it will be well to select a limited portion of North America, instead of wrestling with the intricacies of the continent as a whole, in an endeavor to see how its culture-areas and sub-culture-areas reveal themselves in detail and help to throw light on native history. California will serve as a type example.

152. California and Its Sub-areas

Modern state boundaries frequently do not coincide with either ethnic lines of division or with natural physiographic areas, especially when political units are created by legislative enactment, as has been the case with most of the United States. This partial discrepancy holds for California. The native culture most distinctive of California covered only the middle two-thirds of the present state, but took in Nevada and much of the Great Basin (Fig. 31).

Northernmost California, especially along the ocean, was inhabited by Indians that affiliated with the tribes of the North Pacific coast. One after another their customs and arts prove on examination to be related to the customs and arts of the coast of British Columbia, and to differ more or less from the corresponding practices of the Central California Indians. Here then we have a second cultural type, that of Northwestern California, which constitutes a subdivision of the North Pacific Coast culture-area.

The southern California Indians link with the Indians of the adjoining states of Arizona and New Mexico. In short, this part of California forms part of the Southwest culture-area. The southern California tribes are however not wholly uniform among themselves, but constitute two groups: those of the islands, coast, and mountains, and those of the Colorado river. These are distinguished primarily by the fact that only the river

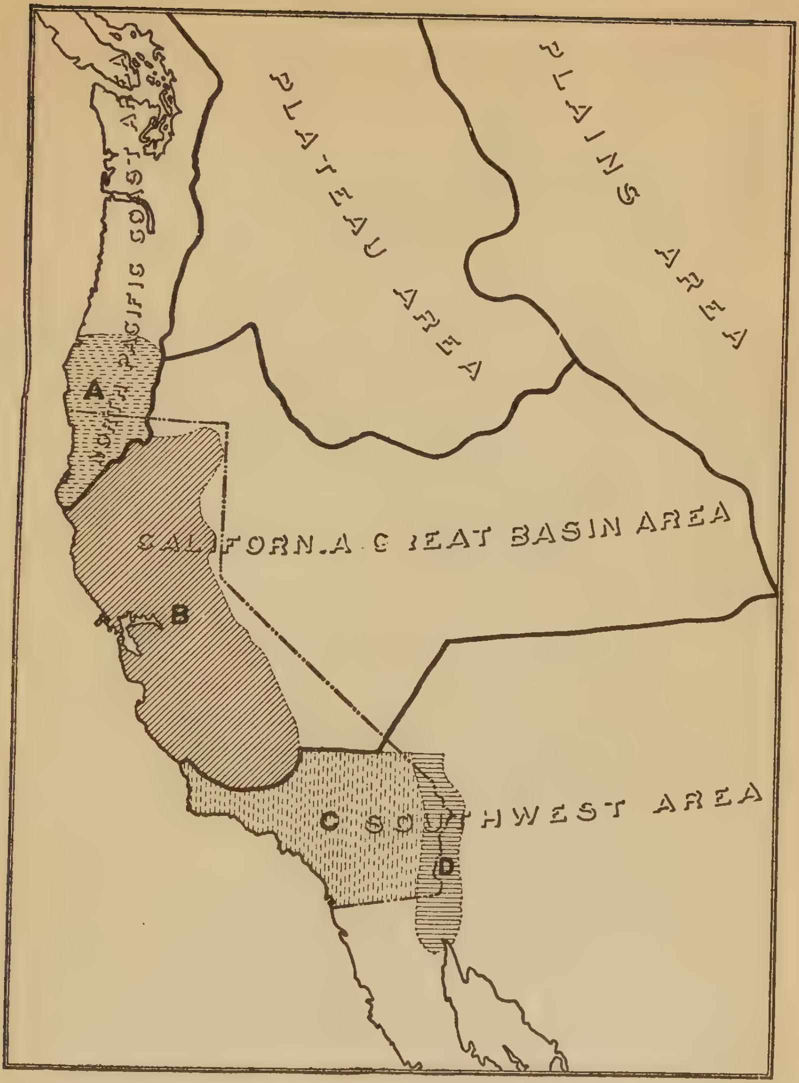


FIG. 31. Sub-culture-areas of native California, as part of the major culture-areas of western North America. *A,* culture of Northwestern California; *B,* Central California; *C,* Southern California; *D,* Lower Colorado River.

tribes practised agriculture. We may designate these two divisions as "Southern California" proper and "Lower Colorado River."

The table on the opposite page gives a brief characterization of these four sub-culture-areas.

153. THE SHAPING OF A PROBLEM

So far we have been discriminating, that is, looking for characteristic differences. On the other hand, there has always existed a consensus of impression, among experienced as well as hasty observers, that a certain likeness runs through the culture of most the tribes of California, northern, central, and southern. With scarcely an exception they were unwarlike; nearly all of them made excellent baskets, but were deficient in wood-working. Obviously it is necessary to reconcile these uniformities with the peculiarities that distinguish the four regional types or sub-culture-areas, as well as to account for the peculiarities.

Let us simplify the problem by considering only one aspect of the four native cultures instead of the whole cultures. In this way there will be more likelihood of making a substantial beginning; any results obtained from the example can be subsequently checked from other aspects of the cultures to see if the findings are broadly representative. Further, let us arrange the items of information that are available on this one aspect of culture, not haphazardly, nor mechanically as under an alphabetic classification, nor in the sequence in which authors have published their observations, but naturally, or according to some principle that is likely to work out into an interpretation. Since part of the problem is the relation of the uniform features to the peculiar ones, a promising order will be to put at one end of the line or series of data the most universal features, and at the other the most particular or localized ones.

Let us select religion as that part of native culture to be examined, and limit this still farther by eliminating from consideration, for the time being, all forms of religion except public rituals, which among Indians are frequently accompanied or signalized by sacred dances. We may forget, for the moment, private rites, individual sacrifices, superstitions and taboos,

	Northwestern California (North Pacific Coast)	*Central California (California-Great Basin)*	*Southern California (Southwest)*	*Lower Colorado River (Southwest)*
Houses	Planks	Earth or thatch	Earth or thatch	Earth
Sweat-houses	Planks	Earth	Earth	None
Head-gear	Women's caps	Men's head-nets	Women's caps	None
Foot-wear	Moccasins	None	Sandals or moccasins	Sandals
Women's skirts	Deer-skin	Deer-skin or fibers	Fibers	Fibers
Basketry	Twined	Twined and coiled	Mostly coiled	Almost absent
Pottery	None	None	Undecorated	Decorated
Boats	Dug-out canoes	Rush rafts	Joined planks	Rush rafts
Paddles	Single-bladed	Single-bladed	Double-bladed	Poles
Staple food	Salmon	Acorns	Acorns and fish	Maize
Ring-and-pin game	Salmon vertebræ	Deer vertebræ	Acorn cups	Pumpkin rind
Shell money	Dentalia	Clam disks	Clam disks	Almost none
Bows	Sinew-backed	Sinew-backed	Plain	Plain
War clubs	Edged stone	None	Knobbed wood	Knobbed wood
Social divisions	None	Dual	Dual and multiple	Multiple
Shamans	Women	Men	Men	Men
Origin legend	Previous race	Creator	Birth from Earth	Birth from Earth
Religious society	None	Kuksu	Jimsonweed	None
Dances	Wealth displays	Spirit impersonations	Simple dances	Dream singings

medicine men, myths, and the like, and direct attention to dances made by groups of people, or the obvious equivalents of such dances, and ritual acts definitely associated with the dances or the common weal.

Choice of this phase of native culture is not quite random; ritual ordinarily is rather freer from the complications caused by natural environment than most other institutions and customs. Had industrial arts, for instance, been selected as the point of attack, it might be imagined that certain tribes made pottery, and others did not, because of the presence or absence of suitable clay in their respective habitats; or perhaps that a particular weave of basketry occurred universally because this weave followed more or less directly from the physical properties of some plant material that abounded everywhere in the state. On the other hand, when tribes do or do not make dances in honor of their divinities, or when they do or do not practise an elaborate mourning for their dead, these are customs into which the influence of natural environment can scarcely enter, since all peoples believe in spirits and suffer the loss of relatives.

154. Girls' Adolescence Rite

When, then, we review the religious dances of the California tribes en masse, we find that there are only two which come near to being universal. One of these is the Victory Dance held over the head or scalp of a slain enemy; the other is an Adolescence Rite performed for girls at puberty. The latter is the more profitable to consider. It is the more widely spread, having been performed in every district of California, and by almost every tribe. The Victory Dance was not made by the Indians of northern California, who substituted for it a war incitement dance of different character. Further, a tribe having the tradition of the Victory Dance might often be at peace and go for a generation or two without the celebration. But a ceremony which it was thought necessary to make for each girl at puberty was obviously due to be performed every few years even among a small group.

There are many local variations in the Californian Adolescence Rite, but certain of its features emerge with constancy.

These traits are based on the belief that the girl who is at this moment passing from childhood to maturity must be undergoing a critical transition. The occasion was considered critical not only for her but for the community, and, since the Indians' outlook was limited, for the whole of their little world. A girl who at this period did not show fortitude to hardship would be forever weak and complaining: therefore she fasted. If she carried wood and water industriously, she would remain a good worker all her life, whereas if she defaulted, she would grow up a lazy woman. So crucial, in fact, was this moment, that she was thought extremely potent upon her surroundings, as constituting a latent danger. If she looked abroad upon the world, oak trees might become barren and next year's crop of acorns fail, or the salmon refuse to ascend the river. Among many tribes, therefore, the maturing girl was covered with a blanket, set under a large basket, or made to wear a visor of feathers over her eyes. Others had her throw her hair forward and keep her head bowed. She was given the benefit of having ancient religious songs sung over her, and dances revolved around her night after night. Certain additional developments of the ceremony were locally restricted. Thus it was only in the south that the girl was put into a pit and baked in hot sand. But a number of specific features occur from the north to the south end of the state. Among these are the following rules. The girl must not eat meat, fat, or salt. She must not scratch her head with her fingers, but use a stick or bone implement made for the purpose. She must not look at people; and she should be sung over.

It should be added that most of these traits of the Girls' Rite recur among the tribes of a much larger area than California, including those of Nevada and the Great Basin and the Pacific coast for a long distance north. This institution, then, is remarkably widespread and has preserved nearly the same fundamental features wherever it is found.

155. The First Period

What can be inferred from this uniformity and broad diffusion? It seems fair to try the presumptive conclusion of antiquity. A continent is likely to be older than an island. A family of animals has probably existed longer than a single species. A world-wide custom normally is more ancient than one that is confined to a narrow locality. If it spread from one people to another, this diffusion over the whole earth would usually require a long time. If on the other hand such a custom had originated separately among each people, its very universality would indicate it as the response to a deep and primary need, and such a need would presumably manifest itself early in the history of the race.

It is true that one may not place too positive a reliance on evidence of this sort. The history of civilization furnishes some contrary examples. Thus the Persian fire-worshiping religion is older than Christianity, yet is now confined to the Parsees of Bombay and to one or two small groups in Persia. The use of tobacco has spread over the eastern hemisphere in four centuries. Still, such cases are exceptional; and in the absence of specific contrary considerations, heavy weight must be given to wideness of occurrence in rating antiquity.

If the Girls' Rite were identical among all the tribes that practise it, there might be warrant for the conclusion that it had originated only a few centuries ago but had for some reason been carried from one tribe to another with such unusual rapidity as not to have been subjected to the alterations of time. Yet the fact that the essential uniformity of the rite is overlaid by so much local diversity—as for instance the baking custom restricted to southern California—indicates the unlikelihood of such a rapid and late diffusion. The ceremony is much in the status of Christianity, which, in the course of its long history, has also become broken into national varieties or sects, all of which however remain Christian.

The facts then warrant this tentative conclusion: that the Girls' Rite is representative of the oldest stratum of religion that can be traced among the Indians of California—their "First Period." The Victory Dance would presumably be of nearly but not quite the same antiquity.

156. The Second Period: Mourning Anniversary and First-salmon Rite

Pursuing the same method farther, let us look for rituals that are less widely spread than these but yet not confined to small districts. The outstanding one in this class is the Mourning Anniversary. This is a custom of bewailing each year, or at intervals of a few years, those members of the tribe who have died since the last performance, and the burning of large quantities of wealth—shell money, baskets, and the like—in their memory. Each family offers for its own dead, but people of special consideration are honored by having images made of them and consumed with the property. Until the anniversary has been performed, the relatives of the dead remain mourners. After it, they are free to resume normal enjoyment of life; and the name of the deceased, which until then has been strictly taboo, may now be bestowed on a baby in the family.

The Mourning Anniversary as here outlined is practised with little variation, less than the Girls' Rite shows, throughout southern California and a great part of central California, especially the Sierra Nevada district. Its distribution thus covers more than half of the state. But it has not spread elsewhere except to a small area in southern Nevada and western Arizona.

In northern California the Mourning Anniversary is lacking. It is not that the Indians here fail to mourn their dead. In fact they frequently bewail them for a longer time than most civilized peoples think necessary. They may bury or burn some property with the corpse. But they do not practise the regular public commemoration of the southerly tribes. They do not assiduously accumulate wealth for months or years in order to throw it into a communal fire at the end. And they do not make images of their dead. In fact, they would be shocked at the idea as indelicate, if not impious. Is there anything in this northern part of California that takes the place of the anniversary?

Not as a psychological equivalent; but as regards distribution, there is. This is the custom, established in northern California and parts of Oregon, for a leading shaman or medicine-man to conduct a ceremony at the beginning of each year's salmon run.

Until he had done this, no one fished for salmon or ate them. If any got caught, they were carefully returned to the river. When the medicine-man had gone through his secret rites, he caught and ate the first fish of the year. After this, the season was open. To eat salmon no longer brought illness and disaster, as it was thought it would a few days earlier. Moreover, the prayers or formulas recited by the shaman propitiated the salmon and caused them to run abundantly, so that every one had plenty. There is clearly a communal motive in the rite, even though its performance was entrusted to an individual.

The one specific element common to the Mourning Anniversary and this First-salmon Rite is their connection with the natural year, the cycle of the seasons, a trait necessarily lacking in the Girls' Rite with its intimately personal character. Because of this common feature; because, also, neither of these two rituals is as widespread as the Girls' Rite and yet between them they cover the whole of California with substantially mutual exclusiveness, it seems fair to assume that they both originated at a later time than the Girls' Rite, but still in fairly remote antiquity. They may therefore be provisionally assigned to a Second Period of the prehistory of California.

157. Era of Regional Differentiation

It is now necessary to return to the four regional divisions or sub-culture-areas of the modern tribes of California. Since the Northwestern one affiliated with the extensive North Pacific culture, and those of Southern California and the Colorado River with the great culture of the Southwest, many of their customs must have originated in those parts of these two culture-areas which lie outside of California. Even if the northern and southern Californians ''lent'' as well as ''borrowed'' inventions and institutions, they must on the whole have received or learned or imitated more in the interchange than they imparted. This is clear from the fact that the Indians of British Columbia are more advanced in their manufacturing ability, richer in variety of tools and utensils, and more elaborate in their organization of society, than those of Northwestern California; and a similar relation of superiority and priority exists between the Pueblos of New Mexico and Arizona and the Southern California tribes (§ 87). In other words, a stream of civilizational influences has evidently run from southern Alaska and British Columbia southward along the coast as far as Northwestern California, and another from the town-dwelling Pueblos to the village-inhabiting tribes of Southern California, in much the same way that civilization flowed from ancient Babylonia into Palestine, from Egypt into Crete, from Greece to Rome, from Rome to Gaul and Britain, from western Europe to the Americas after their discovery, and from the Christian to the non-Christian nations of to-day. Somewhere in the unraveling of the prehistory of California the first indications of these streams from the outside should be encountered.

They are not manifest in the two periods which have so far been established. The distribution of the Girls' Rite of the First Period and of the Mourning Anniversary and First-salmon Rite of the Second, does not coincide with the major culture-areas of the continent. The Southwest, for instance, from which the modern southern Californians have received so much, does not possess any of these ceremonies. The Southwest culture therefore evidently originated, or began to take on its recent aspect, or at least to influence Southern California, chiefly after the two periods had passed by in which these ceremonies became established in California. The Girls' Rite, to be sure, extends up the Pacific coast into Alaska. Yet it is more widespread than the North Pacific Coast culture, since this has its southerly limit in Northwestern California, whereas the ceremony is universal as far as to the southern end of the state, besides occurring inland throughout the Great Basin and Plateau regions. Being more widely spread than the Coast culture, the Girls' Rite is presumptively more ancient.

The beginnings of the four modern types of California native culture must thus evidently be looked for at about the point now reached in our reconstruction. At first there was a single very widespread ceremony; then two less widely diffused ones; the next logical step in development would have been the growth of a still larger number of ceremonies or ritual systems. These, on account of their greater recency, and perhaps on account of conflicting with one another, would have spread only over comparatively small areas. Let us therefore assume that to this Third Period belonged the beginnings of the Wealth-display dances of the Northwestern Indians which are coupled with the idea of world renovation (table, p. 299); the so-called Kuksu dances made among the Central Californians by members of a secret society disguised as divinities; the Jimsonweed rites of the Southern tribes who use this narcotic plant as a mystical means of initiating the young into their religious society; and the series of long singings that the Colorado River tribes are addicted to and believe they have miraculously dreamed.

Of course, the idea could scarcely be entertained that these four local systems sprang into existence full-fledged. They are complicated sets of rituals, quite different from the simple Girls' Rite and Mourning Anniversary. They must have grown up gradually from more meager beginnings and have been a considerable time reaching their present elaboration. It would thus seem justifiable to add not only one but two further periods of religious growth, in the earlier of which—the Third—these ceremonial systems of the historic Indians began their development, whereas in the later or Fourth they achieved it.

158. THIRD AND FOURTH PERIODS IN CENTRAL CALIFORNIA: KUKSU AND HESI

For instance, in the Central California sub-culture-area a series of tribes possess a society to which young men are admitted only after a double initiation with formal teaching by their elders, the first initiation coming in boyhood, the second soon after puberty. The society holds great four-day dances in large earth-covered houses. Time is beaten to the dance and song with rattles of split sticks, and stamped with the feet on a great log drum. The dancers wear showy feather costumes which disguise them to the uninitiated women, children, and strangers, who take them to be spirits of old that have come to exhibit themselves for the good of the people. There may be as many as twelve divinities represented in this way, each with his distinctive name and dress. One of the most prominent of these is the god or "first-man" Kuksu, the founder of the sacred rites, after whom the entire system has been named the "Kuksu Cult."

The tribes participating in the Kuksu Cult are the Patwin, nearer Maidu, Pomo, Yuki, Miwok, and several others. They occupy an area which may be described as the heart of California: namely, the districts adjoining the lower Sacramento and San Joaquin rivers and the Bay of San Francisco into which the two streams pour the drainage of the great interior valley (Fig. 32).

Beyond the Kuksu-dancing tribes there are others, like the farther Maidu, the Wailaki, and some of the Yokuts, among whom the medicine-men are wont to gather for public demonstration of their magical prowess. Thus, they assemble for a competition of "throwing" sickness into one another, or to charm the rattlesnakes so that they can be handled and that no one in the tribe may be bitten during the ensuing year. In these gatherings there is the idea of an association of people endowed with particular powers and operating more or less jointly for the benefit of the community. In short, this fringe of Central tribes beyond the border of the Kuksu Cult evince some of the psychology and motives of the Cult, but without the definite organization of the latter, and also without some of its specific practices, such as god-impersonation. These gatherings of the medicine men thus look as if they might have been the simple and generalized substratum out of which the Kuksu Cult grew by a process of gradual formalization and ritualistic elaboration. This conclusion is corroborated by the distribution. It is the tribes at the ends of the great interior valley, or in the hills above it, whose rites are of this loose type, while in the center are the true Kuksu-dancing groups. There is a periphery of low organization and a core of high organization. According to our previous rule (§ 87, 97), recency in acquisition but antiquity of stage pertain to the marginal as the more widely distributed; the geographically more compact nucleus representing an earlier beginning but a later stage of present development. That is, it is reasonable to believe that the Kuksu Cult grew out of semi-formal gatherings of medicine-men such as still survive in the outlying districts—the "backwoods" of the Central area.

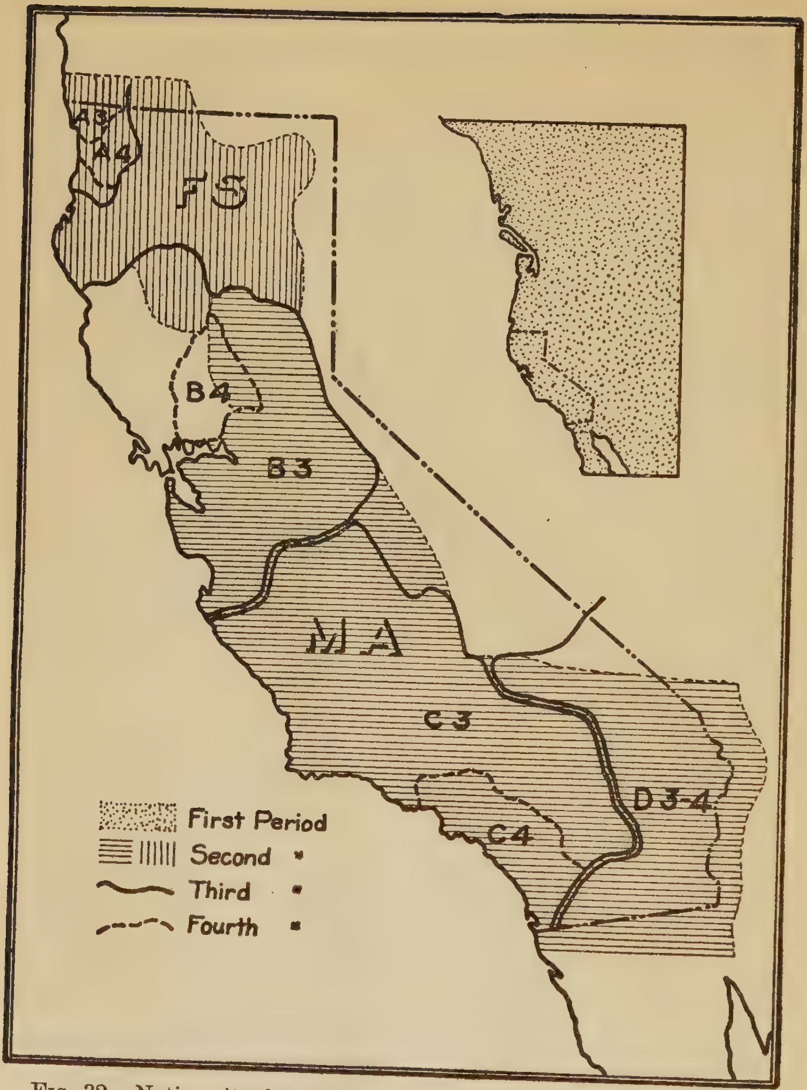


Fig. 32. Native ritual growths in the Californian area, the range of each narrowing in proportion to its recency and specialization. First period, *stippling:* Girls' Rite. Second period, *shading: horizontal, MA,* Mourning Anniversary; *vertical, FS,* First-Salmon Rite. Third and fourth periods, *outlines: A3,* Wealth Display, *A4,* Deerskin Dance; *B3,* Kuksu Society, *B4,* Hesi Dance; *C3,* Jimsonweed Cult, *C4,* Chungichnish Cult; *D3-4,* Dream Singing.

Evidently if a still later religious movement developed as an elaboration or addition of the Kuksu Cult, it should be less widely diffused than this system, forming a sort of nucleus within the core. Actually there is such a later growth. This is the Hesi Dance, confined to the Patwin and Maidu of the lower Sacramento valley (Fig. 32), and regarded by them as the most sacred portion of the Kuksu system. It is the one of all their rituals into which the largest number of differently garbed performers enter, and is made twice a year as the spectacular beginning and finale of the series of lesser Kuksu dances.

The history of native ritual in Central California thus is fairly plain. Early in the Third Period, perhaps already during the Second, the specialists in religion, the medicine-men, had acquired the habit of giving public demonstrations. This resulted in a bond of fellowship among themselves and a sense of exclusiveness toward the community as a whole. Out of this sense there was elaborated during the Third Period, somewhere about the lower Sacramento Valley, the idea of an organized secret society with initiated members. The performances became more and more elaborate, and the production of proof of supernatural power gradually crystallized into impersonations of deities. By the beginning of the Fourth Period, the Kuksu Cult had been established. During this period, it was carried from the center of origin to its farthest limits, whereas at the center the Hesi Dance was evolved as a characteristic addition. If native development had been able to proceed undisturbed, if, for instance, the coming of the white race had been deferred a few centuries longer, the Hesi might have followed the diffusion of the earlier Kuksu Cult; and while this new spread was in progress, the Patwin who form the central nucleus of the whole Kuksu-Hesi movement might have been devising a still newer increment to the system.

159. THIRD AND FOURTH PERIODS IN SOUTHERN CALIFORNIA: JIMSONWEED AND CHUNGICHNISH

The Southern California Jimsonweed Rites are quite distinct from the Kuksu Cult in their regalia, dances, and teachings, but are also based on initiation. It may therefore be concluded, first, that they grew up contemporaneously in the Third Period; and next, that they sprang out of the same soil, a growing tendency of the medicine-men toward professional association. The selection of the jimsonweed as the distinctive element in the south seems to have been due to influences from Mexico and the Southwest. The tribes of Arizona and New Mexico use the plant in religion, the Aztecs ascribed supernatural powers to it, and the modern Tepecano of Mexico pray to it like a god. The Spanish-American name for the plant, toloache, is an Aztec word. Because Mexican civilization was so much the more advanced, it seems likely that the use of jimsonweed originated in Mexico, was carried into the Southwest, and from there spread into Southern California—perhaps at the receptive moment when the medicine-men's associations were drawing more closely together and feeling the need of some powerful emotional element to lend an impetus to their cults.

While the Jimsonweed religion was followed by Californian tribes from the Yokuts on the north to the Diegueño on the south, its most elaborate forms occur among groups near the center of Southern California, especially the Gabrielino of Los Angeles and Catalina Island. This group associates the greatest number of rituals and dances with the Jimsonweed Society, and is therefore likely to have had the leading share in the working out of the religion.

By the opening of the Fourth Period the Gabrielino must have had the Jimsonweed Rites pretty fully developed, while the peripheral tribes like the Yokuts and Diegueño were perhaps only learning the religious use of the drug. The Gabrielino however did not stand still during this Fourth Period, and while the original rather simple Jimsonweed Rites spread north and south, they were adding a new element. This is the Chungichnish Cult, based on belief in a great, wise, powerful god of this name, to whom are due the final ordaining of the world and the institution of the Jimsonweed Rites and their correct performance. Associated with this belief is the use of the "ground painting." This is a large picture, usually of the world, drawn in colored earths, sands, seeds, or paints, on the floor of the sacred enclosure in which the Jimsonweed rituals were practised. This ground painting served both as an altar for the rites and as a means of instructing the initiates (§ 192, 193). The custom of this sacred painting became firmly established among the Gabrielino, and is known to have spread from them to other tribes, such as the Luiseño. From these it has been carried, in part during the last century, after the white man was in the land, to still more remote tribes like the Diegueño, who recognize the Gabrielino island of Catalina as the source of the Chungichnish Cult and sing its songs to Gabrielino words (Fig. 32).

160. Third and Fourth Periods on the Lower Colorado: Dream Singing

In Southeastern California, among the tribes of the Lower Colorado River, the Third and Fourth Periods are less easily distinguished. The reason for this seems to be the fact that religion developed among these tribes less through the invention or establishment of new elements, than by the lopping away of older ones, with the result of a rather narrow specialization on the few elements that were retained. Tribes like the Yuma and Mohave scarcely danced for religious purposes. The special costumes, showy feather headdresses, disguises, musical instruments, sand-paintings, altars, and ritualistic processions that mark the Kuksu and Jimsonweed cults, were lacking among them. They did adhere to the widespread and ancient idea that dreams are a source and evidence of supernatural power. In short, their religion turned inward, not outward. Instead of their medicine-men forming a society based on initiation, the Colorado River tribes came to feel that every one might be a medicine-man according to his dreams. They put emphasis on these internal experiences. The result has been that they believe that a legend can be true and sacred only if it has been dreamed, and that a man's songs should be acquired in the same way. Religion, therefore, is an intensely individualistic affair among them. Since no two men can dream quite alike, no two Yumas or Mohaves tell their myths or sing their song cycles identically. This cast to their religion is so strong that it looks to be fairly ancient. The beginnings of this local type of religion may therefore be set in the Third Period. As for the

Fourth Period, it may be inferred that this chiefly accentuated the tendencies developed in the Third, the dream basis augmenting as ceremonialism dropped away.

161. NORTHWESTERN CALIFORNIA: WORLD-RENEWAL AND WEALTH DISPLAY

The Third and Fourth periods are also not readily distinguishable in Northwestern California. Yet here the rooting of these two eras in the Second is clearer. We have seen that all through northern California there exists the First-salmon Rite conducted by a prominent medicine-man of each locality; and we have referred the probable origin of this rite to the Second period. The modern Indians of Northwestern California consider their great dances of ten or twelve days' duration as being essentially the showy public accompaniment of an extremely sacred and secret act performed by a single priest who recites a magical formula. His purpose in some instances is to open the salmon season, in others to inaugurate the acorn crop, in still others to make new fire for the community. But whatever the particular object, it is always believed that he renews something important to the world. He ''makes the world,'' as the Indians call it, for another year. These New-year or World-renewing functions of the rites of the modern Indians of Northwestern California thus appear to lead back by a natural transition to the First-salmon Rite which is so widely spread in northern California. Evidently this specific rite that originated in the Second Period was developed in the Northwest during the Third and Fourth eras by being broadened in its objective and having attached to it certain characteristic dances.

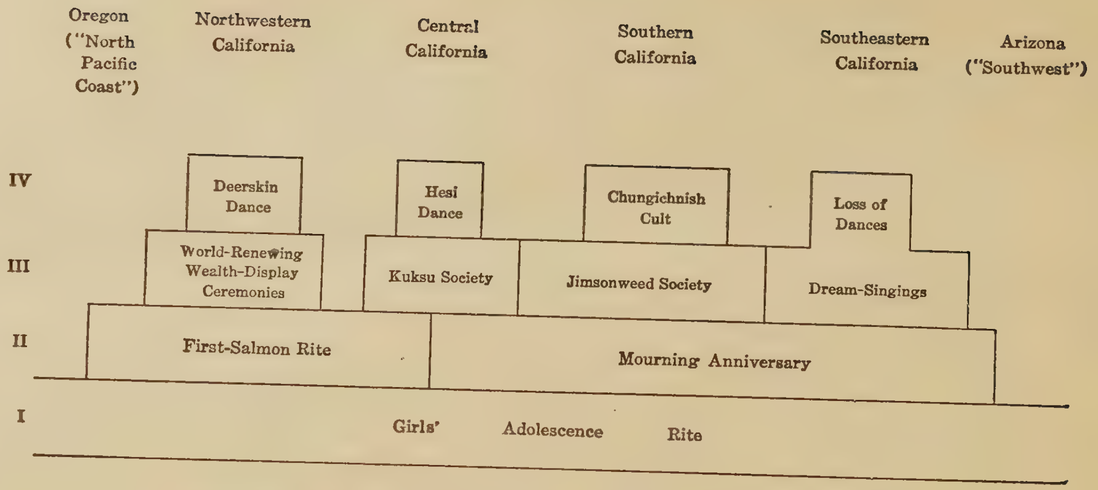
These dances are the Deerskin and Jumping Dances. They differ from those of the Central and Southern tribes in that every one may participate in them. There is no idea of a society with membership, and hence no exclusion of the uninitiated. In fact the dances are primarily occasions for displays of wealth, which are regarded as successful in proportion to the size of the audience. The albino deerskins, ornaments of woodpecker scalps, furs, and great blades of flint and obsidian which are carried in these dances, constitute the treasures of these tribes. The dances are the best opportunity of the rich men to produce their heirlooms before the public and in that way signalize the honor of ownership—which is one of the things dearest in life to the Northwest Californian.

Another feature of these Northwestern dances which marks them off from the Central and Southern ones is the fact that they can only be held in certain spots. A Kuksu dance is rightly made indoors, but any properly built dance house will answer for its performance. A Yurok or Hupa however would consider it fundamentally wrong to make a Deerskin Dance other than on the accepted spot where his great-grandfather had always seen it. The reason for this attachment to the spot seems to be his conviction that the most essential part of the dance is a secret, magical rite enacted only in the specified place because the formula recited as its nucleus mentions that spot.

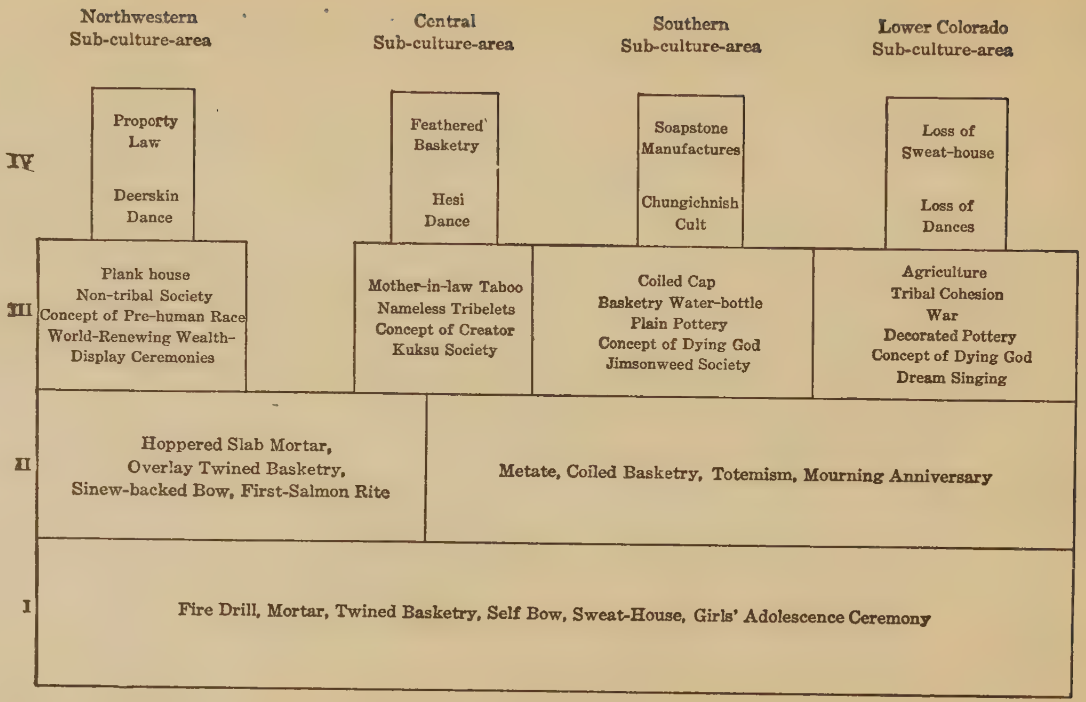
In the Northwest we again seem to be able to recognize, as in the Central and Southern regions, an increasing contraction of area for each successively developed ritual. Whereas the First-salmon Rite of the Second Period covers the whole northern third of California and parts of Oregon, the Wealth-display dances and World-renewing rites of the Third and Fourth Periods occur only in Northwestern California. The Jumping Dance was performed at a dozen or more villages, the slightly more splendid Deerskin Dance only in eight (Fig. 32). This suggests that the Jumping Dance is the earlier, possibly going back to the Third Period, whereas the Deerskin Dance more probably originated during the Fourth.

162. Summary of Religious Development

The history of religious cults among the Indians of California seems thus to be reconstructible, with some probability of correctness in its essential outlines, as a progressive differentiation during four fairly distinct periods. During these four eras, the most typical cults gradually changed from a personal to a communal aim, ceremonies grew more numerous as well as more elaborate, influences from the outside affected the tribes within California, and local differences increased until the original rather close uniformity had been replaced by four quite dis-



Periods of Religious Development in and about Native California.



Periods of Culture Development in Native California.

tinct systems of cults, separated in most cases by transitional areas in which the less specialized developments of the earlier stages have been preserved. This history may be expressed in visual form, as on page 314.

163. Other Phases of Culture

A natural question arises here. Does this reconstructed history apply only to ritual cults, or can a parallel development be traced for other elements of religion, for industries, inventions, and economic relations, for social institutions, for knowledge and art? The findings are that this history holds for all phases of native culture. Material and social development progressed much as did religion Each succeeding stage brought in new implements and customs, these became on the whole more specialized as well as more numerous, and differed more and more locally in the four sub-culture-areas. Thus the plain or self bow belongs demonstrably to an earlier stratum than the sinew-backed one, basketry precedes pottery, twined basketry is earlier than coiled, the stone mortar antedates the slab with basketry mortar as the oval metate does the squared one, earth-covered sweat houses are older than plank roofed ones, and totemism may have become established before the division of society into exogamic moieties. It would be a long story to adduce the evidence for each of these determinations and all others that could be made. It will perhaps suffice to say that the principles by which they are arrived at are the same as those which have guided us in the inquiry into religion. It may therefore be enough to indicate results in a scheme, as on page 315. It will be seen that this is nothing but an amplification of the preceding table. The framework there constructed to represent the history of native rituals has here been further filled with elements of material and social culture.

164. Outline of the Culture History of California

In general terms, the net results of our inquiry can be stated thus.

First Period: a simple, meager culture, nearly uniform throughout California, similar to the cultures of adjacent regions, and only slightly influenced by these.

Second Period: definite influences from the North Pacific Coast and the Southwest, affecting respectively the northern third and the southern two thirds of California, and thus leading to a first differentiation of consequence.

Third Period: more specific influences from outside, resulting in the formation of four local types: the Northwestern, under North Pacific influences; the Southern and Lower Colorado under stimulus of the Southwest; and the Central, farthest remote from both and thus developing most slowly but also most independently.

Fourth Period: consummation of the four local types. Influences from outside continue operative, but in the main the lines of local development entered upon in the previous era are followed out, reaching their highest specialization in limited tracts central to each area.

This summary not only outlines the course of culture history in native California: it also explains why there are both widely uniform and narrowly localized culture elements in the region. It thus answers the question why from one aspect the tribes of the state seem so much alike and from another angle they appear endlessly different. They are alike largely insofar as they have retained certain old common traits. They are different to the degree that they have severally added traits of later and localized development.

165. The Question of Dating

A natural question is how long these periods lasted. As regards accurate dating, there is only one possible answer: we do not know nearly enough. Moreover modern historians, who possess infinitely fuller records on chronology than anthropologists can ever hope to have on primitive peoples, tend more and more to lay little weight on specific dates. They may set 476 A.D., the so-called fall of Rome, as the point of demarcation between ancient and mediæval history because it is sometimes useful, especially in elementary presentation, to speak definitely. But no historian believes that any profound change took place between 475 and 477 A.D. That is an impression beginners may get from the way history is sometimes taught. Yet it is well recognized that certain slow, progressive changes were going on uninterruptedly for centuries before and after; and that if the date 476 A.D. is arbitrarily inserted into the middle of this development, it is because to do so is conventionally convenient, and with full understanding that the event marked was dramatic or symbolic rather than intrinsically significant. In fact, the value of a historian's work lies precisely in his ability to show that the forces which shaped mediæval history were already at work during the period of ancient times and that the causes which had molded the Roman empire continued to operate in some degree for many centuries after the fall of Rome.

Nevertheless there is no doubt that occasional dates have the virtue of impressing the mind with the vividness which specific statements alone possess. Also, if the results of anthropological studies are to be connected with the written records of history proper, at least tentative dates must be formulated, though of course in a case like this of the periods of native culture in California it is understood that all chronology is subject to a wide margin of error.

History provides a start toward a computation, although its aid is a short one. California began to be settled about 1770. The last tribes were not brought into contact with the white man until 1850. As early, however, as 1540 Alarcón rowed and towed up the lower Colorado and wrote an account of the tribes he encountered there. Two years later, Cabrillo visited the coast and island tribes of southern California, and wintered among them. In 1579 Drake spent some weeks on shore among the central Californians and a member of his crew has left a brief but spirited description of them. In all three instances these old accounts of native customs tally with remarkable fidelity with all that has been ascertained in regard to the recent tribes of the same regions. That is, native culture has evidently changed very little since the sixteenth century. The local sub-cultures already showed substantially their present form; which means that the Fourth Period must have been well established three to four centuries ago. We might then assign to this period about double the time which has elapsed since the explorers visited California; say seven hundred years. This seems a conservative figure, which would put the commencement of the Fourth Period somewhere about 1200 A.D.

All the remainder must be reconstruction by projection. In most parts of the world for which there are continuous records, it is found that civilization usually changes more rapidly as time goes on. While this is not a rigorous law, it is a prevailing tendency. However, let us apply this principle with reserve, and assume that the Third Period was no longer than the Fourth. Another seven hundred years would carry back to 500 A.D.

Now, however, it seems reasonable to begin to lengthen our periods somewhat. For the Second, a thousand years does not appear excessive: approximately from 500 B.C. to 500 A.D. By the same logic the First Period should be allowed from a thousand to fifteen hundred years. It might be wisest to set no beginning at all, since our ''First'' period is only the first of those which are determinable with present knowledge. Actually, it may have been preceded by a still more primitive era on which as yet no specific evidence is available. It can however be suggested that by 2000 or 1500 B.C. the beginnings of native Californian culture as we know it had already been made.

166. THE EVIDENCE OF ARCHÆOLOGY

There is left as a final check on the problem of age a means of attack which under favorable circumstances is sometimes the most fruitful: archæological excavation, especially when it leads to stratigraphic determination, that is, the finding of different but superimposed layers. Unfortunately archæology affords only limited aid in California—much less, for instance, than in the Southwest. Nothing markedly stratigraphical has been discovered. Pottery, which has usually proved the most serviceable of all classes of prehistoric remains for working out sequences of culture and chronologies, is unrepresented in the greater part of California, and is sparse and rather recent in those southern parts in which it does occur.

Still, archæological excavation has brought to light something. It has shown that the ancient implements found in shellmounds and village sites in Southern California, those from the shores of San Francisco Bay in Central California, and those along the coast of Northwestern California, are distinct. Certain peculiar types of artifacts are found in each of these regions, are found only there, and agree closely with objects used by the modern tribes of the same districts. For instance, prehistoric village and burial sites in Northwestern California contain long blades of flaked obsidian like those used until a few years ago by the Yurok and Hupa. Sites in Southern California have brought to light soapstone bowls or "ollas" such as the Spaniards a century ago found the Gabrielino and Luiseño employing in cooking and in jimsonweed administration. Both these classes of objects are wanting from the San Francisco Bay shellmounds and among the recent Central Californian tribes.

It may thus be inferred (1) that none of the four local cultures was ever spread much more widely than at present; (2) that each of them originated mainly on the spot; and (3) that because many of the prehistoric finds lie at some depth, the local cultures are of respectable antiquity—evidently at least a thousand years old, probably more. This fairly confirms the estimate that the differentiation of the local cultures of the Third Period commenced not later than about 500 A.D.

167. Age of the Shellmounds

Archæology also yields certain indications as to the total lapse of time during the four periods. The deposits themselves contribute the evidence. Some of the shellmounds that line the ramifying shores of San Francisco Bay to the number of over four hundred have been carefully examined. These mounds are refuse accumulations. They were not built up with design, but grew gradually as people lived on them year after year, because much of the food of their inhabitants was molluscs—chiefly clams, oysters, and mussels—whose shells were thrown outdoors or trodden under foot. Some of the sites were camped on only transiently, and the layers of refuse never grew more than a few inches in thickness. Other spots were evidently inhabited for many centuries, since the masses of shell now run more than thirty feet deep and hundreds of feet long. The higher such a mound grew, the better it drained off. One side of it would afford shelter from the prevailing winds. The more regularly it came to be lived on, the more often would the inhabitants bring their daily catch home, and, without knowing it, thus help to raise and improve the site still further.

Some of these shellmounds are now situated high and dry, at some distance above tide water. Others lie on the very edge of the bay, and several of these, when shafts were sunk into them, proved to extend some distance below mean sea level. The base of a large deposit known as the Ellis Landing mound, near Richmond, is eighteen feet below high tide level; of one on Brooks island near by, seventeen feet. The conclusion is that the sites have sunk at least seventeen or eighteen feet since they began to be inhabited. The only alternative explanation, that the first settlers put their houses on piles over the water, is opposed by several facts. The shells and ashes and soil of the Ellis Landing mound are stratified as they would be deposited on land, not as they would arrange in water. There are no layers of mud, remains of inedible marine animals, or ripple marks. There is no record of any recent Californian tribe living in pile dwellings; the shore from which the mound rises is unfavorably situated for such structures, being open and exposed to storms. Suitable timber for piles grows only at some distance. One is therefore perforce driven to the conclusion that this mound accumulated on a sinking shore, but that the growth of the deposit was more rapid than the rise of the sea, so that the site always remained habitable.

How long a time would be required for a coast to subside eighteen feet is a question for geologists, but their reply remains indefinite. A single earthquake might cause a sudden subsidence of several feet, or again the change might progress at the rate of a foot or only an inch a century. All that geologists are willing to state is that the probability is high of the subsidence having been a rather long time taking place.

The archæologists have tried to compute the age of Ellis Landing mound in another way. When it was first examined there were near its top about fifteen shallow depressions. These appear to be the remains of the pits over which the Indians were wont to build their dwellings. A native household averages about 7 inmates. One may thus estimate a population of about 100 souls. Numerous quadruped bones in the mound prove that these people hunted; net sinkers, that they fished; mortars and pestles, that they consumed acorns and other seeds. Accordingly, only part of their subsistence, and probably the minor part, was derived from molluscs. Fifty mussels a day for man, woman, and child seem a fair estimate of what their shellfish food is likely to have aggregated. This would mean that the shells of 5,000 mussels would accumulate on the site daily. Laboratory experiments prove that 5,000 such shells, with the addition of the same percentage of ash and soil as occurs in the mound, all crushed down to the same consistency of compactness as the body of the mound exhibits, occupy a volume of a cubic foot. This being the daily increment, the growth of the mound would be in the neighborhood of 365 feet per year. Now the deposit contains roughly a million and a quarter cubic feet. Dividing this figure by 365, one obtains about 3,500 as the presumable number of years required to accumulate the mound.

This result may not be accepted too literally. It is the result of a calculation with several factors, each of which is only tentative. Had the population been 200 instead of 100, the deposit would, with the other terms of the computation remaining the same, have built up twice as fast, and the 3,500 years would have to be cut in half. On the other hand, it has been assumed that occupation of the site was continuous through the year. Yet all that is known of the habits of the Indians makes it probable that the mound inhabitants were accustomed to go up into the hills and camp about half the time. Allowance for this factor would double the 3,500 years. All that is maintained for the computed age is that it represents a conscientious and conservative endeavor to draw a conclusion from all available sources of knowledge, and that it seems to hit as near the truth as a calculation of this sort can.

One verification has been attempted. Samples of mound material, taken randomly from different parts, indicate that 14 per cent of its weight, or about 7,000 tons, are ashes. If the mound is 3,500 years old, the ashes were deposited at the rate of two tons a year, or about eleven pounds daily. Experiments with the woods growing in the neighborhood have shown that they yield less than one per cent of ash. The eleven daily pounds must therefore have come from 1,200 pounds of wood. On the assumption, as before, that the population averaged fifteen families, the one-fifteenth share of each household would be eighty pounds daily. This is a pretty good load of firewood for a woman to carry on her back, and with the Indians' habit of nursing their fires economically, especially along a timberless shore, eighty pounds seems a liberal allowance to satisfy all their requirements for heating and cooking. If they managed to get along on less than eighty pounds per hut, the mound age would be correspondingly greater.

This check calculation thus verifies the former estimate rather reasonably. It does not seem rash to set down three to four thousand years as the indicated age of the mound.

This double archæological conclusion tallies as closely as one could wish with the results derived from the ethnological method of estimating antiquity from the degree and putative rapidity of cultural change. Both methods carry the First traceable period back to about 1,500 or 2,000 B.C. After all, exactness is of little importance in matters such as these, except as an indication of certitude. If it could be proved that the first mussel was eaten by a human being on the site of Ellis Landing in 1724 B.C., this piece of knowledge would carry interest chiefly in proving that an exact method of chronology had been developed, and would possess value mainly in that the date found might ultimately be connectible with the dates of other events in history and so lead to broader formulations.

168. General Serviceability of the Method

The anthropological facts which have been analyzed and then recombined in the foregoing pages are not presented with the idea that the history of the lowly and fading Californians is of particular intrinsic moment. They have been discussed chiefly as an illustration of method, as one example out of many that might have been chosen. That it was the California Indians who were selected, is partly an accident of the writer's familiarity with them. The choice seems fair because the problem here undertaken is rather more difficult than many. The Californian cultures were simple. They decayed quickly on contact with civilization. The bulk of historical records go back barely a century and a half. Archæological exploration has been imperfect and yields comparatively meager results. Then, too, the whole Californian culture is only a fragment of American Indian culture, so that the essentially local Californian problems would have been further illuminated by being brought into relation with the facts available from North America as a whole —an aid which has been foregone in favor of compact presentation. In short, the problem was made difficult by its limitations, and yet results have been obtained. Obviously, the same method applied under more favorable circumstances to regions whose culture is richer and more diversified, where documented history projects farther back into the past, where excavation yields nobler monuments and provides them in stratigraphic arrangement, and especially when wider areas are brought into comparison, can result in determinations that are correspondingly more exact, full, and positive.

It is thus clear that cultural anthropology possesses a technique of operation which needs only vigorous, sane, and patient application to be successful. This technique is newer and as yet less refined than those of the mechanical sciences. It is also under the disadvantage of having to accept its materials as they are given in nature; it is impossible to carry cultural facts into the laboratory and conduct experiments on them. Still, it is a method; and its results differ from those of the so-called exact sciences in degree of sharpness rather than in other quality.

It will be noted that throughout this analysis there has been no mention of laws; that at most, principles of method have been recognized—such as the assumption that widely spread culture elements are normally more ancient than locally distributed ones. In this respect cultural anthropology is in a class with political and economic history, and with all the essentially historical sciences such as natural history and geology. The historian rarely enunciates laws, or if he does, he usually means only tendencies. The "laws" of historical zoölogy are essentially laws of physiology; those of geology, laws of physics and chemistry. Even the "laws" of astronomy, when they are not mere formulations of particular occurrences which our narrow outlook on time causes to seem universal, are not really astronomical laws but mechanical and mathematical ones. In other words, anthropology belongs in the group of the historical sciences: those branches of knowledge concerned with things as and how and when they happen, with events as they appear in experience; whereas the group of sciences that formulates laws devotes itself to the inherent and immutable properties of things, irrespective of their place or sequence or occurrence in nature.

Of course, there must be laws underlying culture phenomena. There is no possibility of denying them unless one is ready to remove culture out of the realm of science and set it into the domain of the supernatural. Where can one seek these laws that inhere in culture? Obviously in that which underlies culture itself, namely, the human mind. The laws of anthropological data, like those of history, are then laws of psychology. As regards ultimate explanations for the facts which it discovers, classifies, analyzes, and recombines into orderly reconstructions and significant syntheses, cultural anthropology must look to psychology. The one is concerned with "what" and "how"; the other with "why"; each depends on the other and supplements it.

CHAPTER XIII

THE HISTORY OF CIVILIZATION IN NATIVE AMERICA

169. Review of the method of culture examination.—170. Limitations on the diffusion principle.—171. Cultural ranking.—172. Cultural abnormalities.—173. Environmental considerations.—174. Culture-areas.—175. Diagrammatic representation of accumulation and diffusion of culture traits.—176. Representation showing contemporaneity and narrative representation.—177. Racial origin of the American Indians.—178. The time of the peopling of America.—179. Linguistic diversification.—180. The primitive culture of the immigrants.—181. The route of entry into the western hemisphere.—182. The spread over two continents.—183. Emergence of middle American culture: maize.—184. Tobacco.—185. The sesequence of social institutions.—186. Rise of political institutions: confederacy and empire.—187. Developments in weaving.—188. Progress in spinning: cotton.—189. Textile clothing.—190. Cults: shamanism.—191. Crisis rites and initiations.—192. Secret societies and masks.—193. Priesthood.—194. Temples and sacrifice.—195. Architecture, sculpture, towns.—196. Metallurgy.—197. Calendars and astronomy.—198. Writing.—199. The several provincial developments: Mexico.—200. The Andean area.—201. Colombia.—202. The Tropical Forest.—203. Patagonia.—204. North America: the Southwest.—205. The Southeast.—206. The Northern Woodland.—207. Plains area.—208. The Northwest Coast.—209. Northern marginal areas.—210. Later Asiatic Influences.

169. Review of the Method of Culture Examination

In a previous chapter (VII) it has been shown that culture cannot be adequately explained either by the innate peculiarities of racial stocks nor by the influences of geographic environment; that the factors to be primarily considered in the interpretation of civilization are cultural or social ones.

In a subsequent chapter (VIII) it was made clear that civilization is to a great extent the result of accretion. New elements are handed down in time or passed along in space by a process which psychologically is one of imitation and in its cultural manifestations is spoken of as tradition or diffusion. The chapters on the arch and the week, and the alphabet (X, XI) serve as exemplifications that the principle holds with equal validity in the domains of mechanical, institutional, and intellectual activity. It must be accepted therefore purely as the consequence of an objective or behavioristic examination of human civilization, that while the element of invention or creative progress remains unexplained, the factor of diffusion or imitation is the one that is operative in the majority of cultural events. As contrasted with it, instances of the principle of independent origin or parallel development prove to be decidedly rare, and tend to be illusory on searching analysis or to dissolve into only partial similarities.

In the analysis of the growth of religion in native California (Chapter XII), the attempt was made to apply an assumption derived from the diffusion principle—the assumption that normally the more widely spread element would be the more ancient—to the unraveling of the growth of a civilization which on account of its poverty has left no chronological records; in short, to reconstruct the tentative history of a field lacking ordinary historical data, by converting elements of space into elements of time.

It may now be worth while to apply this method on a larger scale and endeavor to outline the pre-Columbian history of the western hemisphere, which, with some brief and late exceptions in Mexico and Peru, is equally dateless. The cultural connections of native America with the Old World are generally conceded to have been slight: its civilization represents the most important one that in the main developed independently of the Eur-Asiatic nexus.

170. Limitations on the Diffusion Principle

To essay, by the mere principle of converting spatial extent into temporal duration, an accomplishment of such magnitude and ultimately of such complexity as this, may seem simplistic; and it would be. The distribution principle may be the most useful of the weapons in the ethnologist's armory. But it requires supplement and qualification.

First of all, it is obvious that spatial extension must not be measured mechanically. To work on the assumption that a custom or art practised over a million square miles was a third as old again as one practised over seven hundred and fifty

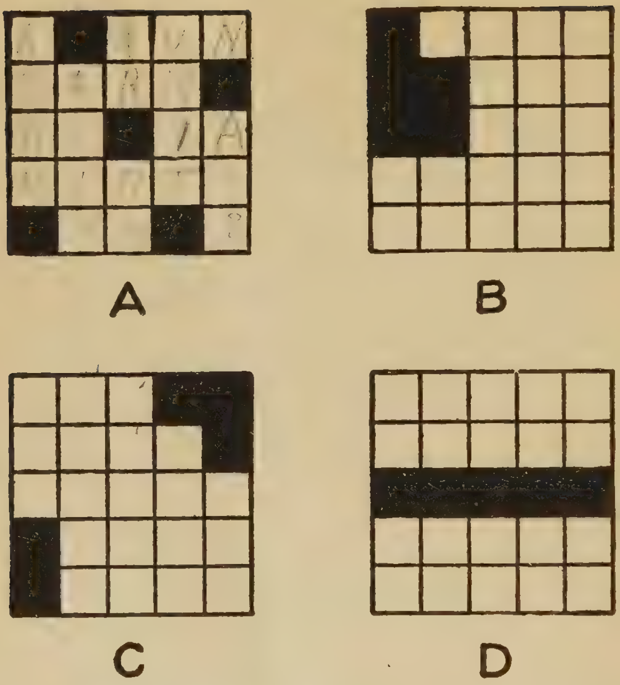


FIG. 33. Schematic illustration of distributions of culture traits as indicative of their history. *A,* distribution corresponding to one by accident, and suggesting that each occurrence is independent of the others. *B,* distribution by contiguous occurrences, strongly suggesting a single invention and subsequent diffusion. *C,* distribution interpretable as due either to independent, parallel origins; or to a single origin, diffusion over the whole area, and subsequent loss of the trait in most parts, with survival only in marginal tracts. The loss in the central area might be due to the growth of a supplanting trait, whose later diffusion had not yet penetrated to the farthest ends. *D,* distribution suggesting a single origin old enough for its diffusion to have become extensive, but checked in certain directions by adverse conditions in nature, communications, or cultural preoccupation. The specific demonstration of such adverse factors would substantiate the interpretation.

thousand, would be too often contrary to the evidence of known history as well as the dictates of reason. Culture traits do die out, from inanition, from sterility of social soil, through supplanting by more vigorous descendants. Continuity is therefore not a necessary ingredient of geographical range. An ancient trait may have been displaced in all but a few remote peripheral tracts. The areas of these may aggregate but little. Yet the distances between them are likely to remain greater than the longest range of a later trait which has replaced the earlier one over most of its original territory.

Thus, alphabetic writing is more recent than the ideographic and rebus methods, but in the year 1500 A.D. was in use over a larger area in Europe, Africa, and Asia than the surviving Chinese and Mexican systems occupied. Yet these two outlying systems enclosed between them a larger tract than those over which the alphabets had diffused.

So, at the same period, was agriculture practised by peoples holding more area than was occupied by non-agricultural ones. But the former constituted two great and continuous groups, one in each hemisphere, to which the non-agricultural peoples in the north of Asia, the south of Africa, the remote continent of Australia, the north of North America, and the south of South America were obviously peripheral. Agriculture being of necessity later than the non-agricultural state, and there being thus no doubt that the marginal hunting peoples represent the remnant of a condition that was once world-wide, it appears that there must be a presumption of validity in favor of reckoning the extent of a scattered custom by its included rather than its actual area.

Of course, the situation is not always so simple. There may exist the possibility of two or more marginal areas sharing a trait as the result of parallelism. Half-hitch basketry coiling in Tasmania and at Cape Horn might logically be the last survival of a very ancient world-wide diffusion, or the product of two thoroughly independent inventions, or of parallel processes of degeneration in isolated and culturally unstimulated nooks. The last two interpretations in fact seem more conservative than the first. If half-hitch coiling were as antecedent in its nature to other coiling and to weaving as wild foods are to cultivated ones; or if the Old Stone Age remains showed it to have been actually so; or if it were practised by a considerable number of tribes in four or five rather large marginal areas instead of two quite narrow ones, diffusion, and the consequent antiquity of the trait, could be inferred with high probability. In short, the periphery argument must not be stretched too thin.

Obviously, too, comparables must be compared: coiling with twining, hand-weaving with loom-weaving; not, however, the very special variety of half-hitch coiling with the entire array of weaving techniques. Nor would it be fair to balance the whole group of true alphabets in the year 500 B.C. against the particular rebus system of Egyptian hieroglyphs from which they were possibly derived but which they had already much exceeded in their diffusion. Yet the distribution of all alphabets as against that of all ideographic and rebus systems would lead, at that date as two thousand years later, to the same interpretation that the facts of history actually give.

171. CULTURAL RANKING

Consideration must also be allowed, within certain limits, to cultural superiority and inferiority. This is a criterion that has been abused in the earlier anthropology, but it is usable with caution, especially where a measure of experience confirms the grading that seems rational. A machine process would normally be later than a manual one: cloth, for instance, subsequent to basketry. The antiquity of both these products happens to be so great that little or no direct historical evidence exists, and their perishability precludes much help from archæology. Yet there is this indirect evidence: there are peoples that make baskets only, others that make baskets and cloth, none that make cloth only. Cloth thus is something superadded, which, not coming into competition of utility with basketry, coexists with it.

Where two devices serve the same end and come into full contact, the issue is even simpler, because the better crowds out the worse. There is no record of any people, once able to produce metal axes or knives, reverting to or inventing stone ones. An adequate system of recording events has always maintained itself. Literacy may have become less frequent, now and then, under economic or military stress, and literature poorer, but no recording culture has ever gone back wholly to oral tradition. Specific systems of records have indeed died out—witness Egyptian and Cuneiform: but only because they were rendered useless by more efficient systems of pure phonetic writing. These, on the other hand, have never been known to yield to non-phonetic systems.

It is very different with culture phenomena whose ranking is based solely on the operation of our imaginations. In such cases judgment should if possible be wholly suspended until evidence is available. For fifty or sixty years it has seemed eminently plausible and natural, even inevitable to most people, that matrilinear institutions preceded patrilinear ones, because a man must know his mother, but in a condition of promiscuity would not know his father. Yet incontrovertible historical evidence of a change is conspicuously deficient, so that the belief in the antecedence of the matrilineate has remained founded solely in hypothesis. As has been indicated above (§ 110) and will be shown more in detail below (§ 185), the indirect evidence of distribution indicates rather that definitely matrilinear and patrilinear institutions have tended to be closely associated, and that among exogamous and totemic peoples the matrilineate has usually been the later phase.

In fact, one important stimulus to belief in matrilineal priority has been the awareness that the most advanced cultures of the recent period have inclined to count descent from the father. But it is obviously unfounded to deduce from this that ancient and primitive nations favored mother-reckoning. It would be equally logical—or illogical—to infer that what is had always been since institutions arose, as to argue that because a thing is now it must formerly not have been.

This points to a further limiting consideration: that it is dangerous to argue from a fraction of culture history to the whole. Particularly dangerous is it to infer from the last four centuries to all that went before. In the present era distant communications have become infinitely more numerous and rapid. Space has in one sense been almost abolished. Diffusions that now encircle the planet in a hundred years would in previous ages often have required a thousand to cross a continent by halting steps from people to people.

Similarly, the results of the diffusion principle may be vitiated by an arbitrary bounding of the spatial field of investigation. A review of African distributions by themselves, for instance, would lead to many misleading conclusions, because it is obvious that African culture has evolved not integrally but as a part of the larger complex Europe-Asia-Africa. What from the angle of Africa thus appears central, like iron, may really be peripheral; what appears marginal, like Islam, is often actually central. By comparison America is so discrete from the Old World, both geographically and historically, that an analogous attempt is far more justifiable. Yet even here, as will appear, some influences from the Old World have operated, whose a priori elimination would lead to false conclusions.

As regards what is high and low, whole cultures as well as culture elements must be considered. Between two civilizations, it is fair to assume that the more advanced will normally radiate, the retarded one absorb. It is known that the drift of diffusion was from western Asia to Greece in 800 B.C., from Greece to western Asia in 300 B.C. In the case of a still unexplained trait common to the two areas and limited to them, the presumption of origin would thus lie in one or the other tract according to whether its appearance fell in the period of Asiatic or Greek culture domination. So in America, loom weaving is shared by Mexicans and Pueblos. If nothing else were known of them except that the former but not the latter had passed from oral tradition to visible records, there would be justification for belief in the probability of importation of the loom from Mexico into the adjacent Southwest. Since this one item of Mexican superiority is reinforced by the facts that the Mexicans cultivated a dozen plants to the Pueblos' three; that they were expert in several metallurgical processes and the Pueblos at best, and rarely, hammered native copper; that the Mexicans alone carried on elaborate astronomical observations, computed with large figures, and had established an intercommunal dominion, the probability of their priority in loom weaving becomes so strong as to serve as a fairly reliable working basis. Still, it is important to remember that in the absence of the direct testimony of history or archæology such a probability does not become a certainty. The Greeks were without writing, metal working, successful astronomy, or empire while these already flourished in Egypt and Asia and were later carried to Greece. Yet in this general period the Greeks developed metrical poetry and vowel signs for the alphabet.

Another limitation to the regularity of the diffusion process is to be found in the inability or unreadiness of undeveloped culture to accept specialized products of more advanced civilizations; and of any culture to accept traits incompatible with its existing customs, except on severe or long continued pressure. A backward tribe might adopt a simple iron-working technique quite avidly, yet find the manufacture of sewing machines beyond its endeavors and wants. Among a people owning little property and no money and therefore not in the habit of counting, and indifferent to their ages or the lapse of time as expressed in numbers of years and days, a calendar system like that of the Babylonians or Mayas would certainly not become established merely because of contact. They might adopt and make use of the knowledge that there are some twelve moons in the round of the seasons, and that the solstices furnish convenient starting points for the count within each year. But generations and centuries of gradual preparation through acceptance of such elementary fragments of the elaborate calendrical scheme would ordinarily precede their ability to take the latter over in completeness. So with a religion like Christianity or Buddhism carried by a lone missionary, or shipwrecked sailors, to a people as simple in their life as the Indians of California. The religion would be too abstract, too remote, too dependent on unintelligible preconceptions, to be embraced. A particular Christian or Buddhist trait, say a symbol like the swastika or cross, might conceivably be taken over and perpetuated as a decorative motive or as a magical charm. True, if the missionary came in the company of troops and settlers, and introduced cattle, regular meals, comfortable clothing, intertribal peace, new occupations and diversions, the old simple culture would often crumble rapidly, and the higher religion be adopted as part of the larger change, as indeed happened in California when the Franciscans entered it. But one would not argue from the convertibility of the Indians under such circumstances to their equal readiness to accept Buddhism from sporadic East Asiatic castaways.

172. CULTURAL ABNORMALITIES

Now and then a condition of cultural pathology must be discounted. About 1889 a messianic religious movement known as the Ghost-dance fired half the Indian tribes of the United States for a few years. In 1891 this had a wider diffusion than any ancient cult. It represented something struck from the contact of two culture systems: it was not of pure native evolution. A point had been reached where the old cultures felt themselves suffocated by the wave of Caucasian immigration and civilization. And in a last despairing delirium they flung forth the delusion of an impending cataclysm that would wipe out the white man with his labor, penalties, and restrictions, bring back the extinct buffalo, and restore the old untrammeled life. Such a cult could not of course have remained permanently active. If analogous excitements occurred in the prehistoric period, they died away without a trace and may therefore be disregarded in a view of long perspective. Or at most they served as ferments productive of other and more stable culture growths. Even if all knowledge of American religion were blotted out except its condition in 1891, the careful investigator would stand in no serious danger of inferring a high antiquity from the broad extent of the Ghost-dance cult, because of the conspicuous elements which it purloined from that very Christianity and Occidental civilization whose encroachments gave it birth.

173. ENVIRONMENTAL CONSIDERATIONS

Two other qualifications on the distribution method must be observed, although they are sufficiently obvious to carry no great danger of oversight. The first concerns gaps or bounds due to physical environment. Metallurgy will not be practised on an isolated coral island. Snowshoes cannot be expected in equatorial lowlands. The spread of the cultivation of a tropical plant like manioc is necessarily restricted no matter how great the antiquity of its use. Limitations of diffusion, or breaks in the continuity of distribution, thus do not count as negative evidence if climate or soil suffice to explain them. This is in accord with what has been previously formulated (§ 83) as to environment being a limiting condition rather than a cause of cultural phenemona.

Secondly, a marginal area need not be literally so. It may actually be nuclear. Thus in the Philippines, older elements of culture are best preserved in the interiors of the larger islands. The coasts show many more imported traits. Communication in the archipelago is by sea, internally as well as in foreign relations; resistance to travel, conquest, intercourse, or innovation is by land. The remote area as regards time may therefore be a mountain range fifty miles inland, while a coast a thousand miles away is near. So a rough hill tract in a level territory, a desert encircled by fertile lands, sometimes remain backward because they oppose the same obstacles to diffusion as great distances.

It is thus evident that valuable as the distribution principle is, perhaps most important of all non-excavating methods of prehistoric investigation, it can never be used mechanically. It must be applied with common sense, and with open-mindedness toward all other techniques of attack. With these provisos in mind, let us approach the problem of American culture.

174. CULTURE-AREAS

The native cultures of the New World are signalized by the two outstanding traits already alluded to. First, they have come to us virtually in momentary cross section, flat and without perspective. In general there are few historic data extant about them. Second, they represent the civilizations of by far the greatest geographical extent and highest attainment that have developed independently, in the main at least, of the great web of culture growths which appear to have had their principal origin in the regions not far from the eastern Mediterranean. They offer, accordingly, a separate problem, and one which, on account of the dearth of temporal data, has had to be approached through the medium of space. As soon, therefore, as knowledge of American cultures became orderly, its organization was inevitably effected in terms of geography. The result has been the recognition of a series of culture-areas or culture-centers, several of which have already been referred to (§ 150-152). These geographically defined types of culture are gradual and empirical findings. They are not the product of a scheme or imagination, nor the result of theory. They are not even the formulation of any one mind. They do represent a consensus of opinion as to the classification of a mass of facts, slowly arrived at, contributed to by many workers, probably accepted in exact identity by no two of them but in essential outlines by all; in short, a non-philosophical, inductive, mainly unimpeachable organization of phenomena analogous to the "natural" classification of animals and plants on which systematic biology rests.

These culture areas, centers, or types have been established with greater exactitude for North than for South America. The ten usually recognized (see Fig. 34) are:

1. Arctic or Eskimo: coastal
2. Northwest or North Pacific Coast: also a coastal strip
3. California or California-Great Basin
4. Plateau: the northern inter-mountain region
5. Mackenzie-Yukon: the northern interior forest and tundra tract
6. Plains: the level or rolling prairies of the interior
7. Northeast or Northern Woodland: forested
8. Southeast or Southern Woodland: also timbered
9. Southwest: the southern plateau, sub-arid
10. Mexico: from the tropic to Nicaragua.

The only serious divergence of opinion as to distinctness or approximate boundaries might arise in regard to numbers 4 and 5 of this list. The culture of the Mackenzie region is so deficient and colorless that some students have hesitated to set it up as a separate unit. The Plateau culture is also vague as to positive traits. A plausible argument could be advanced apportioning it between the adjacent Northwest, Plains, California, and Southwest cultures. In fact, usage has here been departed from in reckoning the Great Basin, that part of the plateau

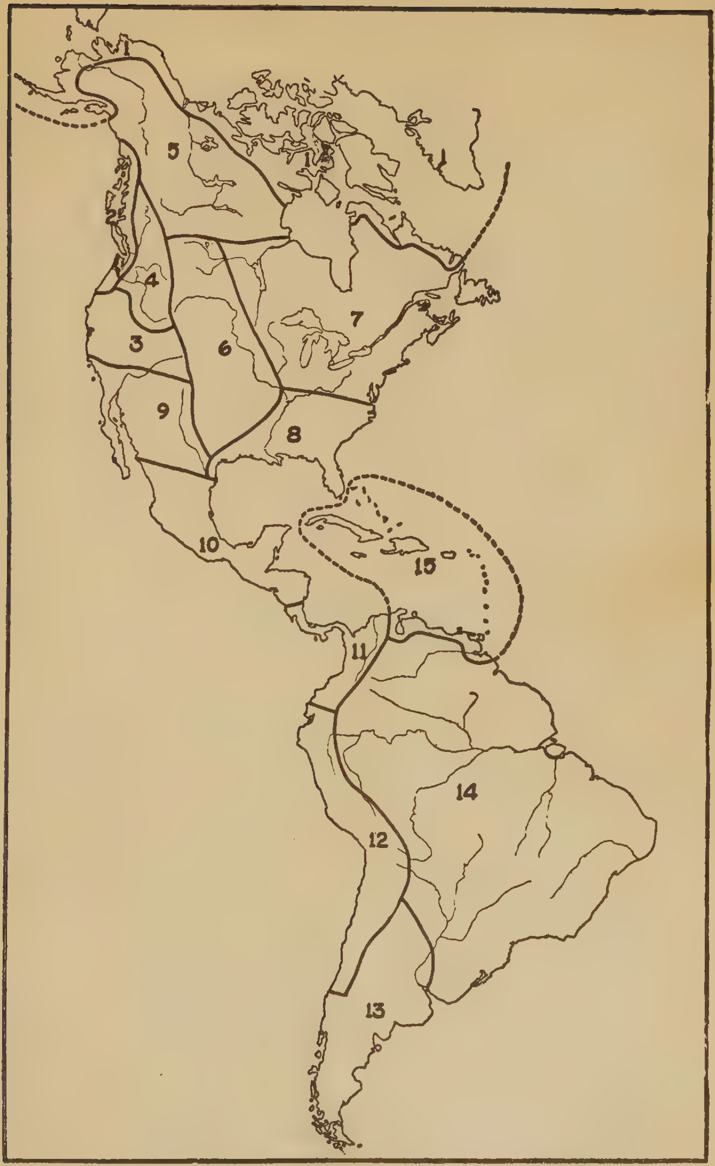


Fig. 34. Culture-areas of America. The numbers refer to the names as listed on pp. 336, 338. (Modified from Wissler.)

which is without ocean drainage, with California instead of the Plateau.

The Mexican area is less homogeneous than any of the preceding. At least three sub-centers must apparently be recognized within it: those of the Nahua or Aztec, Zapotec, and Maya. The Nahua were politically and economically dominant at the time of discovery, but the Maya center is likely to be the oldest. To it seems due most of the progress achieved in architecture, sculpture, calendry, and writing. The sources of knowledge in the Mexican area are historic and archæological rather than contemporaneously ethnological, and are available through the medium of Spanish writings. Also the phenomena are more diverse and intricate, as is only natural with higher cultures. The consequence is that they are scarcely as well ordered as those from north of Mexico and have not yet been brought into as close a comparable relation with the latter as these among themselves.

South American cultures seem to arrange themselves on fewer lines of cleavage than those of the northern continent. Only five areas are as yet distinctly recognizable. This paucity is perhaps due to a less intensive search for facts and less systematic attempt to classify them, so that future studies may increase the number of areas recognized. Yet a simplicity of plan of culture relationships is evident. The narrow strip between the Andes and the Pacific is a region of rather high culture throughout, the whole remainder of the continent one of much lower and comparatively uniform culture. The areas determined are:

11. Colombia or Chibcha: western Colombia with the nearer parts of Central America and northwestern Ecuador. This is in the main a timbered region.

12. Andean or Peruvian: from southern Ecuador to northern Chile and northwestern Argentina. This is distinctively an arid to sub-arid and unforested belt.

13. Patagonia: characteristically an open, semi-arid country.

14. Tropical Forest: the vast Orinoco, Amazon, and La Plata drainages, prevailingly lowland, humid, and containing the greatest forest in the world. Three sub-regions stand out with a certain ethnic differentiation, although the basis of their cul-

ture seems to be that of the woodland. They are: the savannahs of the Guiana region; the highlands of eastern Brazil; the Chaco, west of the middle La Plata system. All three of these are open areas or only part timbered.

15. Antillean: the West Indies, including probably the Venezuela coast. This culture was the earliest to perish in the New World. It received the first shock of Caucasian discovery and settlement, and its carriers had no hinterland to which to retreat. It is therefore imperfectly known. Its closest affiliations are with the preceding area. In fact, the Antillean may yet prove only a subdivision of the Tropical Forest culture. In the discussions that follow, it has been omitted, but can in the main be understood as included in what is said of the Tropical Forest area.

175. Diagrammatic Representation of Accumulation and Diffusion of Culture Traits

The outstanding facts regarding these fourteen or fifteen culture-areas can be most vividly presented in a table allotting a column to each area. Roughly, at least, these columns can follow one another in geographical order. In each column, then, there might be entered all the culture traits found in its area. If one culture were twice as rich or complex as another, the double number of entries would pile up twice as high and impress the eye.

Actually, such a procedure is hardly practicable. The number of culture elements is too great. Often too there would be doubt whether a feature should be reckoned as one or several. Metal working comprises smelting, casting, forging, alloying, plating, soldering, and welding. These are distinct techniques. Yet they usually occur together or are all lacking. One tribe practises simple two-ply twining. Another adds three-strand, diagonal, and lattice twining and three-strand braiding, probably as developments of the original two-strand process. As between two adjacent or related basket-making peoples, this difference may be very significant; measured against cloth weaving, it is trivial.

Accordingly, in order to render the data more easily apperceived and conceptualized, only the more fundamental aspects of arts and institutions have been included in the diagram (Fig. 35), plus some that perhaps involve intrinsically less significant principles or faculties, but were of particular importance in the life of the peoples following them, such as the tipi or skin tent of the Plains tribes. This means that a necessarily subjective selection of traits has been made in the compilation of the table. But the reader who is not a specialist in the matter will generally be grateful for the elimination; and this elimination has at least been conducted without a conscious bias in any one direction. If anything, it would seem that the selective condensation has operated against the preëminence of the advanced areas. With every possible datum inserted, the peaks in the table would probably overshadow the valleys much more conspicuously.

Accepting the diagram, then, as affording an approximately truthful picture, it is obvious that much the greatest advancement took place in Middle America—the region from Mexico to Peru; and that on the whole the majority of culture traits found in any of the more backward areas are shared with this middle region. These are the traits below the heavy line that steps up and down across the diagram. A minority of traits—those above the heavy line—are local to the several areas. On the basic principle that a trait occurring over a continuous territory may be assumed to have originated but once and to have spread by diffusion, the bulk of the culture of most of the areas must have come into them from outside. On the principle that a people with many established arts is more likely to make a new invention than is a retarded people, the great majority of the diffused elements may therefore be attributed to a Middle American source. In this region, then, lay the focal point, the hive, of American civilization. From it, the tribes of the Lower Amazon and the upper Mississippi equally derived most of the limited culture which they possessed.

In South America, the diffusion proceeded broadside from the length of the Andes. In North America, it radiated fanwise from the south Mexican angle, the Southwest serving as the gateway or first relaying station that let through most but not all of what it received. One area alone, the Northwest

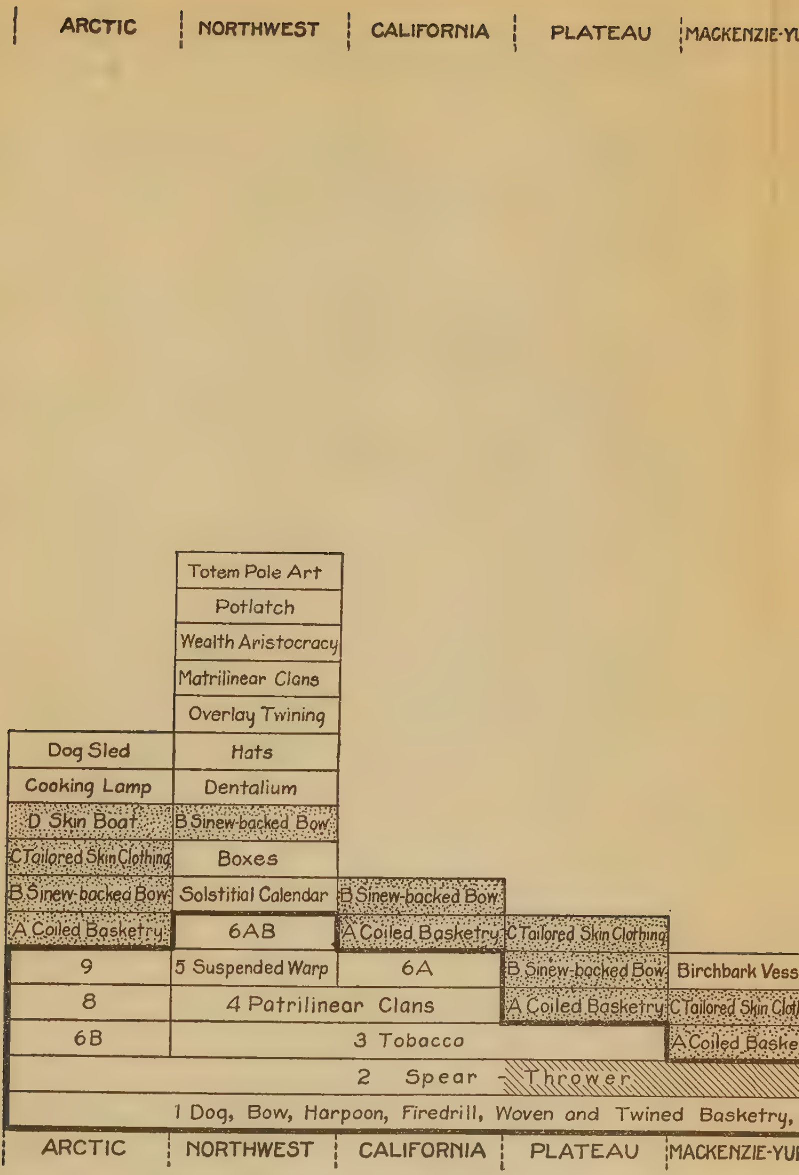
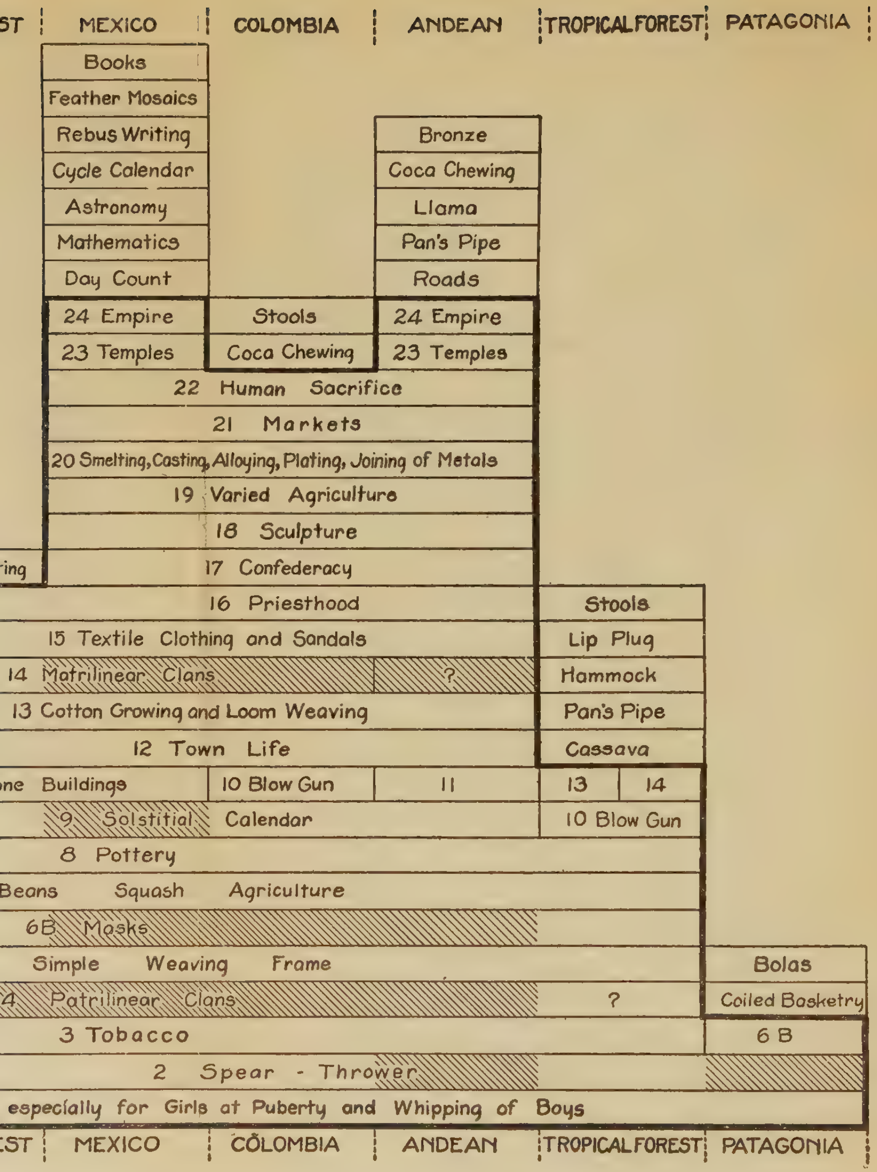


FIG. 35. Diagram illustrating the occurrence of some representative
for the figure as a whole, horizontal levels do not indicate contemporane
in Middle America, to fall away towards the peripheries. Hatching indica
the heavy line are local developments.



neral, assumed early elements are below, late ones above, *within each column;* but ntative of quantity or elaboration of culture content, which towers impressively now lacking; stippling, elements perhaps introduced from Asia. Entries above

Coast, was reached but imperfectly by Middle American influences, yet attained a tolerable development through its own creative force, supplemented in some measure by the drift into it of sporadic culture element migrants from Asia. Here only, then, there occurred a markedly independent growth of civilization, though definitely secondary to the great evolution of Middle America which in the main determined the culture of the twin continents.

176. Representation Showing Contemporaneity and Narrative Representation

So far as possible, the traits in each column of the diagram have been disposed in the order of their presumptive appearance in time. In the lowest level, for instance, have been set those elements that are likely to have been common to all the first immigrants into America. Local developments tending on the whole to be late, have been placed toward the heads of columns; and, roughly throughout, widely diffused and therefore apparently early elements are nearer the bottom. In general, accordingly, the sequence upward of traits indicates their approximate sequence in time. But this arrangement obviously holds chiefly for each column as a unit. As between the columns, it breaks down, since the top of each column would represent the same period, the moment of discovery, and these tops are not on a level.

The display of the same data in such a manner that vertical position would adequately represent proportional lapse of time as the horizontal placing suggests geographical contiguity, would necessitate another arrangement. In such a diagram the height of each column would be the same, but the richer cultures would have their constituent elements more closely crowded. That is, each new invention or institution or importation followed more rapidly on its predecessor than in the peripheral areas. For instance, while maize agriculture was spreading from Middle America to the Southwest and thence to the Northeast, the Middle Americans were adding varied agriculture and metallurgy, human sacrifice, and astronomy. The strata in the diagram would therefore generally not be level but would slope upward from their origin in the middle. This would be a more accurate schematic representation of what happened.

On the other hand, difficulties would arise in the graphic representation. The domestication of the llama, for instance, is confined to a single area, the Andean. Yet the domestication is rather ancient, as archæological discoveries prove; perhaps older than the spread of many culture elements from the Andes into the Tropical Forest, or from Mexico into the United States. The llama could therefore not be placed properly near the head of the column representing Andean culture, because the top of this column would signify recency. It would have to be inserted lower down, thus breaking the continuity of strata extending through several areas. Thus the diagram would quickly become so intricate as to lose its graphic value.

It would simplify the problem if the large mass of culture elements could be segregated into a small number of groups, each assignable to a stratum or period, much as the constituents of the religion and then of the whole culture of the California Indians were analyzed and then regrouped in the preceding chapter. Such a procedure, however, is much easier and more accurate for the subdivisions of one limited area than for an entire hemisphere, because the interrelations of the areas constituting this are naturally very complex and at many points imperfectly known. Such a schematic representation of the course of culture in the whole of the Americas on the basis of as many traits as are included in Figure 35, is therefore not attempted here. Instead, there is reproduced an analogous but simpler scheme (Fig. 36) recently published by an author whose primary concern is with Middle America, who has presented his story in the form of a treatment by larger periods, and in his diagram extends these to the remainder of the two continents. If his figure seems different from the preceding one, it should be remembered that the two approaches are not only from somewhat different angles but independent of each other, besides which it will be found that the divergence between the two illustrations (Figs. 35 and 36) is more apparent than intrinsic.

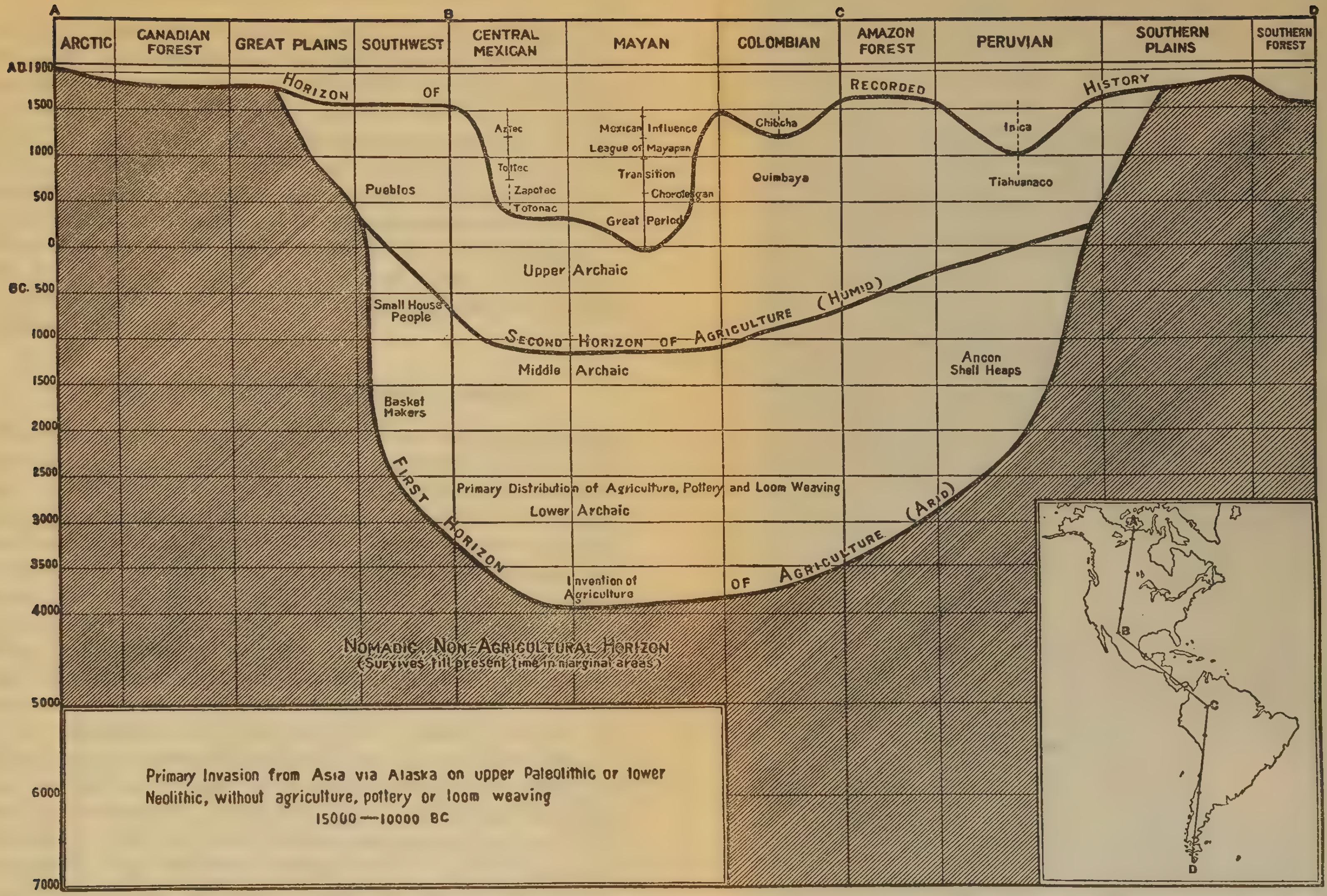


Fig. 36. Diagrammatic representation by Spinden of the development of native American culture. Fewer elements of culture are included than in figure 35, but these are definitely placed according to their indicated sequence in time. While this diagram was prepared with particular reference to Middle American civilization and therefore has reference only to the culture areas cut by the line ABCD, and while it carries the peopling of the continent a few thousand years back of the time assumed in this book, it is in substantial agreement with the views expressed in the present chapter.

At best, however, all diagrams are not only schematic but static; and it may accordingly be worth while to try to narrate some of the principal events of the history of American civilization in order to bring out their continuity and relations as they appear in perspective. But the reader must remember that this is a reconstruction from indirect and often imperfect evidence, probably correct in the large and in many details, certain to be incorrect in some proportion of its findings, tentative throughout and subject to revision as the future brings fuller insight. It aims to give the truth as it can be pieced together: it is never a directly documented story like those familiar to us from orthodox "history."

177. Racial Origin of the American Indians

The American race can hardly have come from anywhere else than Asia: it entered the New World perhaps ten thousand years ago. Its affiliations, as previously set forth (§ 23, 25) are generically Mongoloid. This statement does not mean that the American Indians are descended from the Chinese or Japanese, any more than the fact that these are denominated Mongolians implies belief in their descent from the particular modern people known as the Mongols. We call ourselves Caucasians without any intimation that our ancestors lived in the Caucasus mountains or that the present inhabitants of the Caucasus are a purer and more representative stock than we. So the Mongolians are that group of "yellow" peoples of eastern Asia of whom the Mongols form part; and the Mongoloids are the larger group that takes in Mongolians, East Indians, and Americans. From the original proto-Mongoloid stem, all three divisions and their subdivisions have sprung and differentiated. The American Indians have probably remained closer to it than the Chinese. It would be more correct to say that the Chinese have developed out of an ancient Indian-like stock, acquiring slant eyes rather late.

The proto-Mongoloid stem must be ten thousand years old. It is probably much older. In the Aurignacian period, the third from the last in the Old Stone Age, twenty-five thousand or so years ago, possibly longer, the two other great types of living men were already rather well characterized. The fossil Grimaldi race of this period shows pretty clear Negroid affinities; the contemporary Cro-Magnon race can probably be reckoned as proto-Caucasian. It is therefore probable, although as yet unproved by discoveries, that the proto-Mongoloids were also already in existence.

178. The Time of the Peopling of America

About the end of the Palæolithic or beginning of the Neolithic some of these proto-Mongoloids drifted from Asia into North America. These were probably the real discoverers of the New World, which they found inhabited only by brutes. The time of their invasion can be but roughly fixed, yet within its limits it seems fairly reliable. Had the migration occurred much later, when the Neolithic was already well under way, the domesticated animals and plants of the Old World would have been introduced—cattle, pigs, sheep, wheat, barley, rice, millet, all of which the Americans lacked. The same holds for inventions like the wheel.

Analogous arguments weigh against a belief in a possible earlier peopling of America, say in the middle Palæolithic. In that event there ought to be cave or rock shelter or river terrace deposits corresponding to those of Europe in containing only implements of Palæolithic type. But none such have been found in America, or where alleged, their circumstances have remained matters of controversy.

Further, if Palæolithic man had inhabited the western hemisphere, it is likely that his fossil remains would have come to light. There has been much excavation, and numerous investigators are alive to the importance which evidence of this sort would bear. Yet to date not a single human fossil of positively Pleistocene age or type has been discovered. Numerous sensational finds have been announced. But in every case their geological matrix or stratum has been proved either recent or open to doubt. And not a single fragment of a skeleton of Neandertal type, or one equally different from modern man, is on record from America. Every once alleged Pleistocene skull or part appears to belong to some branch of the American Indian race as it exists to-day. It is therefore unlikely that man reached America before the last stage of the Palæolithic.

If the date of the entry is set at ten thousand years ago, the elapsed period accounts very well for the present diversification of the American race. There are broad and narrow headed tribes, tall and short ones, some with hooked noses, others with slightly wavy hair. But the fundamental type is everywhere the same. The differences seem just such as environment and mode of life, the accidents of descent from small groups, and perhaps a slight effect of selection, would be certain to accomplish in time. In general, the natives of America are remarkably homogeneous, considering the vast territory they occupy, its variations of temperature, humidity, altitude, and food supply, and the marked differences in the living customs of many tribes. The one group that at all stand apart are the Eskimo; and these are distinct in language and culture also. Moreover, they occupy the parts nearest to Asia, including both sides of Behring Strait. Thus they seem to represent a separate origin. But all the other groups from Alaska to Patagonia are so closely related somatically, that no comprehensive and generally accepted sub-classification of them has yet been possible. In fact, the American race seems almost too undifferentiated to require ten thousand years for its superficial diversifications; until it is remembered that human races left to themselves seem in most cases to alter rather slowly. Mixture is one of the greatest factors of racial change, and in the isolation of America this element was eliminated to a much larger extent than in most of the Old World.

179. Linguistic Diversification

Language tells a similar story. The American Indian languages certainly appear to be diverse. It has been customary to reckon about a hundred and fifty distinct speech families in North and South America (§ 50). But many of these are imperfectly known; of late several Americanist philologists have been inclined to see definite resemblances between numerous tongues that are superficially different. Buried and disguised resemblances are being noted, which point to original unity.

Thus the number of genetically distinct families or language stocks is shrinking. The number to be ultimately recognized bids fair to be small.

Old World conditions are at bottom more similar than at first glance seems. English and the modern Hindu languages, such as Bengali, although certainly related, are quite different from each other. The proof of their common Indo-European origin rests largely on the similarities between their ancestral forms, Anglo-Saxon and Sanskrit. These in turn are tied together more closely by the connecting evidence of other ancient languages, such as Greek and Latin. Take away these extinct tongues and the modern transitional ones, imagine English and Bengali to be the only representatives of Indo-European, and it is doubtful whether their common parentage could be wholly proved. The relationship would certainly not be readily recognizable; the most painstaking analysis would reveal so many words wholly peculiar to each language, and so many exceptions to every suggestion of regular sound equivalences, that conservative philologists would perhaps refuse to commit themselves on the problem of a single origin.

This imaginary situation parallels the actual one in American linguistics. Not a single ancient form of speech has been preserved. Many living ones are inadequately known. The fact that some enthusiast has compiled a grammar of Nahuatl or Quechua or Eskimo does not necessarily mean that he has dissected out its whole structure. A book devoted to a language may be as superficial as it looks learned. And the man who really knew Nahuatl has usually concerned himself very little with Quechua. So far as he might become acquainted with it, it would appear so different that the pressing of comparisons would seem sterile. Thus the great diversity of American languages came to be accepted not because any one believed it to have been really established, but because until recently no critical scholar considered himself able to establish serious connections. It has been a case of unproved rather than disproved unity of origin.

If the Indo-European languages were not our own but those of a strange race and therefore known to us much less intensively; if the history of their ancient forms were obliterated instead of preserved for us for over three thousand years; and if they were allowed a period of ten thousand years in which to have differentiated, philology would probably be assigning them to several distinct stocks. Multiply by three the amount of difference which Bengali shows from Sanskrit, and by six that of English from Anglo-Saxon, and a degree of divergence might be attained roughly comparable to that between Nahuatl and Quechua, or Maya and Iroquois. This is not an assertion that Nahuatl and Quechua are related. It is a claim that in the light of present knowledge they might have been one language ten thousand years ago. A single people with a single speech could well have given rise in so long a period as that—three hundred generations—to languages that now seem so different.

And at that, there is no reason for believing that all the American languages are necessarily derivable from a single mother tongue. There might have been half-a-dozen or a dozen idioms in use among as many populations which moved out of Asia into Alaska. For of course it is improbable that the migration was an isolated, unitary event. More likely it filled a period of some length, during which a succession of waves of population lapped from one continent into the other. Each of these waves, which only the perspective of ages has merged into the appearance of a single movement, may have brought its own speech, from which in time there branched out languages that ultimately became so differentiated as to appear now like distinct families. Not that it is known that this happened; but it seems inherently plausible that it might have happened, and there is no present evidence to the contrary.

In short, philology interposes no obstacle to the acceptance of the date which has been assumed as roughly defining the period of the peopling of America.

180. The Primitive Culture of the Immigrants

As to the culture the immigrants brought with them, direct testimony being lacking, it is necessary to fall back on the working hypothesis that this culture was about the equivalent of the most backward American culture of to-day; or, better, of the common denominator of all American cultures, including the lowest. This procedure yields the group of elements entered in the bottommost layer of Figure 35. These elements were either brought along on the invasions or developed so soon afterwards as to become equally widely diffused. The harpoon, for instance, was used in Europe in the Magdalenian—at the close of the Palæolithic. For the bow and arrow, there is no proof in Europe until the opening of the Neolithic. The dog, the earliest animal attached to man, is known from the same period, whereas cattle, swine, and sheep were kept only at the height of the Neolithic (§ 67, 222). As the American Indians possess dogs, it is difficult to attribute the custom otherwise than to a heritage from the same culture stage in the Old World to which the harpoon and bow belong. This connection is made more certain by the fact that the Indian dog is most closely related not to the specifically American coyote but to the circumpolar wolf and perhaps the jackal, and diverged into much the same types of breeds as the Old World dog. There are American races of dogs—some of them ancient, as represented by skeletons from mounds, and mummies from Arizona and Peru—that are respectively droop eared, curly tailed, short legged, long furred, hairless, or undershot in the jaw, thus corresponding closely to the breeds evolved with similar traits in the eastern hemisphere, and virtually forcing the conclusion that the dog was brought into America by man and not domesticated from a wild species in this continent.

Such evidence as this it is that yields the period indicated—the closing stages of the Palæolithic or earliest Neolithic—as the time of man's entry into America. The ten thousand years set as the lapse since this event are admittedly more arbitrary. No one pretends to date the remoter stages of European prehistory exactly. Relative durations are all that it is legitimate to pin much faith on. Dates are avowedly approximations. The estimate here chosen for the end of the Palæolithic is 8000 B.C. —ten thousand years ago. This round number, not taken too literally, has the virtue of concreteness and seems somewhere near the truth. It may yet prove to be a few thousand years short or over. But it does allow enough time, and no obtrusive excess of time, for the diversification of the Indians in race, speech, and culture; and this seeming accord of the assumption with the present facts may be taken as a rough corroboration.

The other culture elements assigned in Figure 35 to the first or immigrant stratum cannot be dated by any concrete remains, since some are institutions and others are arts whose materials are perishable—baskets and fire-drills, for instance. They are, however, found among all or most of the lower American tribes, and recur more or less widely in the eastern hemisphere.

The first settlers may accordingly be pictured as a people living off nature; hunting, fishing, gathering roots and fruits and seeds, digging or picking shellfish. Their best weapons were the bow and the harpoon with detachable head. The latter may already have been propelled by the atlatl or spear-thrower, an artificial extension of the arm. Simpler weapons were also used: clubs, stones, probably darts and spears, perhaps daggers of bone or stone. Flint was chipped and flaked, other stones were beginning to be ground or rubbed into form. Bone awls served for piercing; less certainly, eyed needles for sewing. Cordage of bast was twisted, and in all likelihood baskets, bins, weirs, traps were woven or twined, perhaps also nets made. Dogs were alternately played with and kicked about; they were half kept, half tolerated, probably eaten in time of need. There was no organization of society but on a basis of blood and contiguity. Related groups would act together until they fell apart. Labor was sex allotted; the men of each community possibly maintained a house or place of meeting at which they gathered in their leisure, perhaps nightly, and which women feared to enter. Beliefs in souls and spirits were already immemorially old. The people had risen to the point of being no longer passive toward the immaterial; the most intense-minded among them aspired to communication with the spirits; they demonstrated to their fellows their control and utilization of supernatural beings, and were what we call shamans. Custom in fact conceded the influence of the spiritual world on every human being, and felt it to be strongest at times of passage or crisis—birth, maturity, death. Puberty in particular seemed important, as portentous of the whole of adult life. The welfare of the individual and his proper relation to the community were therefore sought to be insured by spiritual safe-guarding. Girls were secluded, treated or doctored, trained; boys subjected to whipping or other ordeals of fortitude; the passing of such initiation admitted them to the men's house.

181. THE ROUTE OF ENTRY INTO THE WESTERN HEMISPHERE

With such background man entered America at Behring Strait. He may have navigated; more likely, or more often, he crossed on the ice. The water distance is only about sixty miles; the Diomede islands lie near the middle of the gap; and the ice may have extended across pretty continuously, ten thousand years nearer the peak of the last glaciation. Long before, there had been a land bridge from Siberia to Alaska, by which horses, camels, cattle, elephants, deer and many other species extended their range from one continent to another. But this was in geological antiquity, man's entry in geological recency—immediacy, rather; and the divided configuration of the continents was probably already established. Horses had become extinct in the New World when man arrived, the elephant tribe probably also. Llamas, pumas, jaguars took the place of Old World camels, lions, tigers. The fauna of the Americas, their vegetation, their climate, were nearly as they are to-day.

The Aleutian islands have also been suggested as a migration route. But their chain is long, the gap at the western end one of hundreds of miles of open water, scarcely negotiable except to rather expert navigators. Still weaker would be any supposition of arrival from Polynesia. Here the distances between the nearest islands and the mainland run to thousands of miles. Only well-equipped voyagers could survive, and there is nothing to prove positively that even late Palæolithic man had boats. Further, all the Polynesian evidence points to a late settling of the eastern islands of the Pacific; a few thousand years ago at most. Exclusion therefore indicates the Behring route as the only one to be seriously considered.

The migration was scarcely a sudden or single one. It went on for generations, perhaps for thousands of years in driblets. Two or three explorers would set across and return, to be followed by a few families. Others succeeded them. There would be no crowding, for a long time no resistance at the strait on the part of jealous established settlers. The open south, always milder, generally more fruitful the farther one went, lay ahead. It must long have drawn immigrants away from the strait faster than they crossed it. Some of the invading bands almost certainly differed from one another in customs, perhaps perceptibly in appearance, though of one general level of culture.

182. The Spread Over Two Continents

Before them lay fifteen million miles of tundra, forest, plains, sea coast, desert, savannah, jungle, and plateaux, rich in this or that food, with no occupant to dispute possession or block travel but bear, wolf, puma, and jaguar—timid beasts compared with those of the Old World. So the immigrants pushed across the breadth of the continent and down its length, entered the tropics in Mexico, defiled through Panama—and a second continent stretched before them. How long it took the first wanderers to diffuse themselves from Alaska to the Strait of Magellan, it is impossible to say. Perhaps a couple of thousand years, perhaps only a few hundred. Curiosity, the desire to see, are strong in men if fear imposes no restraints.

Sooner or later, at any rate, they were living throughout both continents. The advance guard had long lost knowledge of the rear, if indeed the rear did not arrive until after the advance could progress no farther. When the Caucasian discovered America he might have commenced at Cape Horn, gone on to a people whose very existence was unknown to those at his starting point, and repeated the step a dozen times until his journey brought him to the Arctic. Before the rise of the empires of Mexico and Peru the number of links in the chain ignorant of each other would have been greater. The moving bands of the primitive first-comers no doubt lost touch with each other quickly in even shorter stretches. Thus diversities of speech, of mode of life, would become established. A family of brothers might become dominant in a band through the number of their descendants and so color the somatic type of the group, which in turn, favored by fortune and expanding, might lay the hereditary foundation for a sub-racial variety.

Movements of population continued to occur until the present. The maps of speech stocks previously presented (Figs. 14, 15) prove that distant migrations took place after great groups like Athabascan, Algonkin, Uto-Aztecan, Arawak, Tupi, had each lived in compact coherence long enough to establish a well defined language. But so far as these more recent migrations can be traced from speech, they no longer trended prevailingly from north to south and west to east as the first general diffusion must have moved, but shifted in the greatest variety of direction. They are a sort of boiling of the kettle, not a downhill flow. They relieved internal strains and vacillated back and forth with circumstances; they represented no drift like the first occupation. Much of their story may ultimately be worked out and provide a national history of pre-Columbian America. But the effect of these later pressures and expansions and wanderings on the culture development of the New World as a whole is likely to have been relatively slight.

183. Emergence of Middle American Culture: Maize

For perhaps five thousand years little of wide significance happened in America. There may have been progress, but it was slow, and in the long perspective of time its slender evidences are not yet determinable. One can affirm little of this early period except that differences in culture must have begun to develop in conformity with the localized opportunities of environment.

But by the end of the first half of the duration of American antiquity, let us guess somewhere about 3000 B.C., a perceptible differentiation appears to have taken place between the culture of the Middle American[1] highland and the remainder of the Americas. The highland had forged ahead. Especially, perhaps, was this true of the region of southern Mexico and Guatemala. Why it was here that civilization first gathered a notable momentum, it is difficult to say; we are dealing with obscure beginnings at a remote period. An unusual concentration of population is likely to have been an important factor. This in turn may have rested on the ease of existence in a sub-tropical area. Advanced civilizations in general find their greatest opportunities in fairly temperate environment; incipient ones in semi-tropical climates or unforested regions in the tropics. At least there are the parallels of Egypt, Babylonia, India. Possibly the environmental feature of greatest value to cultural progress in Middle America was its diversity. Mountain and coast, temperate highland and hot lowland, humid and arid tracts, tropical jungle and open country, were only a few hours apart. In each locality the population worked out its necessary adaptations, and yet it was near enough others of a different adaptation for them to trade, to depend on one another, to learn. Custom therefore came in contact with custom, invention with invention. The discrepancies, the very competitions, would lead to reconciliations, readaptations, new combinations. Cultural movement and stimulus would normally be greater than in a culturally uniform area.

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[1] Mexico, Central America, and the coast and mountain parts of Colombia, Ecuador, Peru, and Bolivia.

Be that as it may, Middle America took the lead. It is in the region of southern Mexico that a wild maize grows—teocentli, "divine maize,"[1] the Aztecs called it. From this, in a remote archaic period, the cultivated plant was derived. At least, such seems to be the probability in a somewhat tangled mass of botanical evidence. Here then the dominant plant of American agriculture was evolved: with it, very likely, the cultivated beans and squashes that are generally associated in native farming even in parts remote from Mexico.

Pottery has so nearly the same distribution as maize agriculture, as to suggest a substantially contemporaneous origin, probably at the same center. This is the more likely because the art is of chief value to a sessile people, and farming operates more strongly than any other mode of life to bring about a sedentary condition.

Agriculture almost certainly increased the population. The food supply was greater and more regular; people got used to living near each other where before they had unconsciously drifted apart through distrust; and the proximity in turn, as well as the new stability, would lessen many of the local famines, hostilities, and other hardships to which the smaller and less settled communities had been exposed. As the death rate went down and numbers mounted, specialization of labor would be first made possible, and then almost forced. A self-contained community of a hundred cannot permit much specialization of accomplishment and none of occupation. Every man must be first of all an immediate food getter. On the other hand a community of a million inevitably segregates somewhat into classes, trades, guilds, or castes. The individual with decided tastes and gifts in a particular direction finds his products in enough demand to devote himself largely or wholly to their manufacture. The very size of the community as it were forces him to specialization, and thus diversity, with its train of effects leading to further stimulation, is attained independently of environment.

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[1] Maize is the name of the plant in England, continental Europe, and Latin America. In the United States "corn," short for Indian corn, is in current usage; but this word means grain or cereal in general.

184. TOBACCO

For some culture elements, the evidence of early origin in Middle America is less direct. The use of tobacco, for instance, is as widely spread as agriculture, but is not necessarily as ancient. Its diffusion in the eastern hemisphere has been so rapid (§ 98) as to make necessary the admission that it might have spread rapidly in the New World also—faster, at any rate, than maize. Moreover, a distinction must be made between the smoking or chewing or snuffing of tobacco and its cultivation. There are some modern tribes—mostly near the margins of the tobacco area—that gather the plant as it grows wild. It is extremely probable that wild tobacco was used for some time before cultivation was attempted. Nevertheless tobacco growing, whenever it may have originated, evidently had its beginning in the northern part of Middle America, either in Mexico or the adjacent Antillean province. It is here that *Nicotiana tabacum* was raised. The tribes to the north contented themselves with allied species, mostly so inferior from the consumer's point of view that they have not been taken up by western civilization. These varieties look like peripheral substitutes for the central and original *Nicotiana tabacum.*

The Colombian and Andean culture-areas used little or no tobacco, but chewed the stimulating coca leaf. This is a case of one of two competing culture traits preventing or perhaps superseding the other, not of tobacco never having reached the Andes. Most of the remainder of South America used tobacco.

185. The Sequence of Social Institutions

The most peripheral and backward peoples of both North and South America even to-day remain without clans, moieties, hereditary totems, or exogamic groupings (§ 110). Some of these, like the Eskimo and Fuegians, live at the extreme ends of the continents, under conditions of hardships which might be imagined to have directed all their energies toward the material sides of life and thus left over little interest for the development of institutions. But this argument will not apply to the many clanless tribes of the California, Plains, and Tropical Forest areas. It must accordingly be concluded that those American nations that show no formal organization of society on a hereditary basis—or at least the more primitive ones who possess no equivalent or substitute—do without this organization because they never acquired it. This negative condition may then be inferred as the original one of the whole American race.

Somewhat more advanced culturally, on the whole, and less definitely marginal, at any rate in North America, are several series of tribes that do possess exogamic groups—either sibs or moieties—in which descent goes in the male line and is generally associated with totemic beliefs or practices. These comprise the tribes of one segment of the Northwest Coast area; those of one end of the Southwest with some extension into California; and those of most of the Northern Woodland, with some extension into the Plains.

Another series of tribes live under the same sort of organization but with descent reckoned in the female instead of the male line. These comprise the peoples of one end of the Northwest Coast; those of one portion of the Southwest; and those of the Southeast, with some extensions into the Northeast and Plains.

These exogamic-totemic series of tribes average higher in their general culture than the clanless and totemless ones. On the whole, too, they are situated nearer the focus of civilization in Middle America. As between the two exogamic-totemic series the matrilinear tribes must be accredited with a more complex and better organized culture than the patrilinear ones. The finest carving in North America, for instance, is that of the Northwest—totem poles, masks, and the like. Within the Northwest, the Tlingit, Haida, and Tsimshian—matrilinear tribes—excel in the quality of this work. They far surpass the patrilinear Kwakiutl and Salish. So in the Southwest: the matrilinear Pueblos build stone towns, obey a priestly hierarchy, and possess an elaborate series of cult societies. The patrilinear Pimas and southern Californians live in villages of brush or earth-covered houses, are priestless, and know at most a single religious society. Again, the matrilineal Southern Woodlanders had made some approach to a system of town life and political institutions, the patrilineal Northern Woodlanders did without any serious institutions in these directions. The one Northeastern group that established a successful political organization, the Iroquois with their League of the Five Nations, were matrilinear among patrilinear neighbors and possessed positive affiliations with the Southeast.

It would be extravagant to maintain that throughout the North American continent every matrilineal tribe was culturally more advanced than every patrilineal one. But it is clear that within each area or type of culture the matrilineal tribes manifest superiority over the patrilineal tribes in a preponderance of cultural aspects. The matrilineal clan organization thus represents a higher and presumably later stage in North America than patrilineal clan organization, as this in turn ranks and temporally follows the clanless condition.

With one exception, the distribution of the same tribes with reference to the South Mexican center agrees with their advancement. The Northeast is distinctly peripheral, the Southeast a half-way tract connected with Mexico by way both of the Southwest and the Antilles. The matrilineal Pueblo portion of the Southwest occupies part of the plateau backbone near the southern end of which the Mexican culture developed. It was along this backbone that civilization flowed up through northern Mexico. The coasts lagged behind. They were marginal in

Mexico, more marginal still in the Southwest, where the patrilineal tribes lived on or near the Pacific.

The one exception is in the Northwest Coast, where the more remote northerly tribes are matrilinear, the nearer southerly ones patrilinear. This reversed distribution raises the suspicion that the Northwestern social oganization may have had nothing to do with Mexico, but may be a purely local product. This suspicion is hardened by the fact that the Northwest shows a number of other culture traits—some peculiar to itself, others recurring in well separated areas—which it seems impossible to connect with Mexico. Several of these traits will be discussed farther on. For the present it is enough to note their existence as an indication favorable to the interpretation of the Northwest social organization as unrelated to Mexico. Thus the abnormal matrilineal-patrilineal distribution in the Northwest is no bar to the generic finding for North America that clanless, patrilinear, and matrilinear organizations of society rank in this order both as regards developmental sequence and distance from Middle America.

For South America the data are too scattering to discuss profitably without rather detailed consideration.

The distributional facts outside Middle America thus point to this reconstruction of events. The original Americans were non-exogamous, non-totemic, without sibs or unilateral reckoning of descent. The first institution of exogamic groups was on the basis of descent in the male line, occurred in or near Middle America, and flowed outwards, though not to the very peripheries and remotest tracts of the continents. Somewhat later, perhaps also in Middle America, possibly at the same center, the institution was altered: descent became matrilinear. This new type of organization diffused, but in its briefer history traveled less far and remained confined to the tribes that were in most active cultural connection with Middle America.

Now, however, a seeming difficulty arises. Middle America, which appears to have evolved patrilinear and then matrilinear clans, was itself clanless at the time of European discovery.[1]

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[1] The contrary has been alleged. To dispose of the allegations seriatim would involve the minute examination of much evidence. Clan organization is here used in reference to arbitrary, named, intratribal exogamic groups

The solution is that Middle America indeed evolved these institutions and then went a step beyond by abandoning or transforming them. Obviously this explanation will be validated in the degree that it can be shown that probable causes or products of the transformation existed.

186. RISE OF POLITICAL INSTITUTIONS: CONFEDERACY AND EMPIRE

In general, the transformation would seem to have been along the line of a substitution of political for social organization. Struggling villages confederated, with a fixed meeting place and established council; the authority of elected or hereditary chiefs grew, until these gave the larger part of their time to communal affairs; towns consolidated. Public works could thus be undertaken. Not only irrigating ditches and defenses, but pyramid temples were constructed. In Middle America this condition must have been attained several thousand years ago. The Mayas had passed beyond it early in the Christian era. They were then ruled by a governing class and priesthood, and were erecting dated monuments that testify to a settled existence of the more successful of their communities.

In the area of the United States, which may be reckoned as perhaps two thousand years more belated than southern Mexico, political organization was still in the incipient stage at the time of discovery. The Pueblos of the Southwest had achieved town life and considerable priestly control. They had not taken the further step of welding groups of towns into larger coherent units. In the Southeast, however, while the towns were less

to which the individual belongs inalienably by virtue of his birth, his descent being necessarily reckoned on one side only; and totemic phenomena being usually though not always associated with the group. A segregation of society into groups based primarily on blood kinship, co-residence, town quarters, occupation, social rank, or subordination to a chieftain is not a clan organization. Nor is the unilateral reckoning of descent a sufficient criterion. Our modern family names descend patrilineally without any historical connection between them and a clan organization. In general, statements as to the existence of clan systems in Middle America, at least among the advanced nations of Mexico and Peru, rest either on a loose use of terms; on the assumption that they must have existed at the time of discovery; or on a forward projection into the historic period of the belief that they had once existed. This belief is accepted here without such projection.

compact physically, and probably less populous, political integration on a democratic basis had made some headway. The institution evolved was essentially a confederacy of the members of a language group, with civil and military chiefs, council houses, and representation by "tribes" or towns and clans. From the Southeast the idea of the confederacy was carried into the Northeast by the Iroquois, whose famous league, founded perhaps before Columbus reached America, attained its culmination after the French and English settlement and the introduction of firearms. The Iroquois league was an astounding accomplishment for a culturally backward people. Its success was due to the high degree of political integration achieved. Yet it did not destroy the older clan system, in fact made skilful use of it for its own purposes of political, almost imperialistic, organization.[1]

Some stage of this sort the Mexican peoples may have passed through. The Maya form of political organization was evidently similar to that of the Pueblos, the Aztec development more like that of the Muskogeans and Iroquois. A thousand years before Columbus the Maya cities were contending for hegemony like the Greek city-states a millenium earlier. Then the Nahua peoples forged to the front; and about two centuries before the invasion of Cortez, Tenochtitlan, to-day the city of Mexico, began a series of conquests that ended in some sort of empire. It was a straggling domain of subjected and reconquered towns and tribes, interspersed with others that maintained their independence, extending from middle Mexico to Central America, containing probably several million inhabitants paying regular tribute, held together by well-directed military force, and governed by a hereditary line of half-elected or confirmed rulers of great state and considerable power. The exogamic clan organization as such had disappeared. Groups called calpulli were important in Aztec society, but they were local, or based on true kinship, and non-totemic. They may have been the made-over survivals of clans; they were not clans like those of the Southwest, Southeast, or Northwest.

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[1] Why the Southwest with its solid towns of a thousand and more inhabitants, its generally greater advancement, and proximity to Mexico, should never have progressed to larger political units, is not wholly clear. The reason may be that the Pueblo was a heavily ritualized culture, whose emphasis was on the priest, not the governor or councilor. Such government as the Pueblos had was distinctly theocratic. They were also disinclined to fight. Southeastern religion was quite simple in comparison, an important priesthood lacking, and the warlike spirit rather strong.

Five successive stages, then, were probably gone through in the evolution of south Mexican society. First there was the preclan condition, without notable organization either social or political; next, a patrilinear clan system; third, a matrilinear clan system, with more important functions attaching to the clans, especially on the side of ceremonial; fourth, the beginnings of the state, as embodied in the confederacy, the clans continuing but being made use of chiefly as instruments of political machinery; fifth, the empire, loose and simple indeed, judged by Old World standards, but nevertheless an organized political achievement, in which the clans had disappeared or had been transformed into units of a different nature.

187. Developments in Weaving

In the textile arts, since the successive stages rank one another rather obviously, and the distributions coincide well with them, the course of development is indicated plainly.

The first phase was that of hand-woven basketry, which has already been accredited to the period of immigration, and is beyond doubt ancient. All Americans made baskets at one time or another. The few tribes that were not making them at the time of discovery had evidently shelved the art because their environment provided them with birch bark, or their food habits with buffalo rawhide, with exceptional ease, and because their wants of receptacles and cooking utensils were of the simplest. That basket making goes back to a rudimentary as well as early stage of civilization is further suggested by the fact that perhaps the finest ware is made in the distinctly backward areas, such as the Plateau and California.

A second and a third phase, which are sometimes difficult to distinguish, are those of loose suspended warps and of a simple frame or incomplete loom. Pliable cords of some sort, or coarse bast threads, are employed. The objects manufactured are chiefly wallets or bags, blankets of strips of fur or feathers, hammocks, and the like. These two processes are widely spread, but not quite as far as basketry; the northern and southern extremes of the double continent do not know them. Occasionally, very fine work is done by one or the other of these two methods. The most striking example is the so-called Chilkat blanket of the Northwest Coast, a cloth-like cape, woven, without a complete loom, of mountain goat wool on cedar bark warps to a complicated pattern—a high development of a low type process.

The fourth stage is that of the true or complete loom. In America the loom is intimately associated with the cultivation of cotton. The two have the same distribution, except for some use of the plant for the twining of hammocks on a half-loom in portions of the Tropical Forest area. Disregarding this case as a probable part adaptation of a higher culture trait to a lower culture, we may define the distribution of both loom and cotton as restricted to the Middle American areas, the adjacent Southwest, and perhaps the adjacent Antilles. This is certainly central.

The fifth stage is the loom with a handle or mechanical shedding device, obviating tedious hand picking of the weft in and out of the warps. The heddle is proved only for Peru. It was probably used in Mexico. It may therefore be tentatively assumed to have been known also in the intervening Chibcha area It is used to-day in the Southwest, but may have been introduced there by the Spaniards. This stage accordingly is limited even more strictly to the vicinity of Middle America.

The sixth stage, that of the loom whose heddles are operated by treadles, and what may be considered a seventh, the use of multiple heddles to work patterns mechanically, were never attained by any American people.

The best and finest fabrics were made in Peru, in part probably as consequence of the addition of wool to the previous repertory of cotton. This addition in turn probably followed the domestication of the llama by the Peruvians. The Mexicans had no corresponding animal to tame, and their textiles lagged behind in quality.

188. PROGRESS IN SPINNING: COTTON

Spinning and weaving are interdependent. Baskets are made of woody rods, cane splints, root fibers, or straws, all untwisted, but it is probable that the ability to twist cordage is about equally old as basketry. At any rate there is no American people ignorant of cord making. The materials are occasionally sinews, more frequently bast—that is, bark fibers. These are rolled together, almost invariably two at a time, between the palm and the naked thigh. Cordage is used for the second and third stages of weaving. The cotton employed in loom weaving does not spin well by this rolling method. It was therefore spun by being twisted between the fingers, the completed thread being wound on a spindle. This spindle served primarily as a spool or bobbin. In the Old World the distaff has been used for thousands of years. This is a spindle with a whorl or flywheel. It is dropped with a twirl, giving both twist and tension to the loose roving of linen or wool and thus converting it into yarn by a mechanical means. The New World never fully utilized this device. The Southwest to-day uses the wheeled spindle, but evidently as the result of European introduction. Old Mexican pictures and modern Maya photographs show the spindle stood in a bowl, not dropped. The whorl which it possessed was therefore little more than a button to keep the thread from slipping off the slender spindle. For Peru this is established. Thousands of spindles have been found there, normally with whorls too small and light to serve as an effective flywheel. It may then be concluded that all American spinning was essentially by hand; which is in accord with the absence from all America of any form of the wheel. The Indian spinning methods were only two: thigh rolling for bast, finger twisting for cotton.

The origin of the higher forms of spinning and weaving in Middle America is confirmed by the tropical origin of cotton, on which these developments depend. The cotton of the Southwest, for instance, was introduced from Mexico as a cultivated plant. It is derived by some botanists from a Guatemalan wild species. This may well have been the first variety to be cultivated in the hemisphere.

189. TEXTILE CLOTHING

Clothing in general is too much an adaptation to climate to render satisfactory its consideration wholly by the method here followed. But clothing of textiles shows a distribution that is culturally significant. The distribution is that of loom-woven cotton; the salient characteristic is rectangular shape: the blanket shawl, the poncho, the square shirt and skirt. In the Northwest Coast region hand and half-loom woven capes and skirts of bast were worn more or less. But these were flaring—trapezoidal, not rectangular—and thus evidently represent a separate development.

In all the cloth weaving areas, and in them only, sandals were worn. The spatial correlation is so close that there must be a connection. It may be suggested that the sandal originated, or at least owed its spread, to textile progress. Again the Northwest Coast corroborates by being unique; it is essentially a barefoot area.

To summarize. The original textile arts of the race were probably first advanced to the stages intermediate between basket and cloth making in Middle America. Thence they spread north and south, but not quite to the limits of the hemisphere, being retained in special usage chiefly in the Northwest. With the cultivation of cotton in Middle America, spinning and the loom came into use, and were ultimately carried to the Southwest, but not beyond. Cloth garments and sandals promptly followed. The heddle was evidently devised last, and did not diffuse beyond Middle America.

190. CULTS: SHAMANISM

In the matter of religious cults, seven entries have been included in Figure 35: (1h) shamanism, and (1i) crisis ceremonies, especially for girls at puberty and the whipping of adolescent boys, two more or less synchronous traits; (6a) initiating societies, and (6b) masks—also about contemporaneous; (16) priesthood; and (22) human sacrifice and (23) temples.

The shaman is an individual without official authority but often of great personal influence. His supposed power comes to him directly from the spirits as a gift or grant. He himself, as a personality, has been able to enter into a special relationship, denied to normal persons, with the supernatural world or some member thereof. The community recognizes his power after it is his: the community does not elect him to his special position, nor accept him in it by inheritance. His communion with spirits enables the shaman to foretell the future, change the weather, blast the crops or multiply game, avert catastrophes or precipitate them on foes; above all, to inflict and cure disease. He is therefore the medicine-man; a word which in American ethnology is synonymous with shaman. The terms doctor, wizard, juggler, which have established themselves in usage in certain regions, are also more or less appropriate: they all denote shamans. When he wishes to kill his private or public enemy, the shaman by his preternatural faculties injects some foreign object or destructive substance into his victim, or abstracts his soul. To cure his friends or clients, he extracts the disease object, sometimes by singing, dancing, blowing, stroking, or kneading, most often by sucking; or he finds, recaptures, and restores the soul. Of the two concepts, that of the concrete disease object is more widely spread; that of the soul theft is apparently characteristic of the more advanced tribes; but the exact distribution remains to be worked out.

The territorial extent of shamanistic ideas and practices is from the Arctic to Cape Horn. The method of acquiring power from spirits, the nature of the disease object and its process of extraction, the conviction that sickness must be caused by malevolent shamanistic power, there being no such thing as natural death; these and other specific features of the institution are sometimes surprisingly similar in North and South America. In fact, they recur in peripheral parts of the eastern hemisphere—Siberia, Australia, Africa—with such close resemblance as strongly to suggest their being the remnants of a once world-wide rudimentary form of religion or religious magic.

191. CRISIS RITES AND INITIATIONS

Crisis rites are of equally broad diffusion and apparent antiquity. They concern the critical points of human life: birth, death, sometimes marriage and childbirth; but most frequently, or at least most sacredly, they are wont to concern themselves with maturity. They are thus often puberty ceremonials, made for the welfare both of the individual and of the community, and fitting him or her for reproductive functions as well as for a career as a useful and successful community member. The girls' adolescence rites have been described (§ 154) in some detail for California. With but minor variations, the account there given applies to the customs of many American and in fact Old World peoples. The boys' rites come at the corresponding period of life, but their reference to sex and marriage is generally less definite. Fortitude, manliness, understanding are the qualities they are chiefly intended to test and fix. Privations like fasting, ordeals of pain, admonitions by the elders, are therefore characteristic elements of these rites. It is thus not as surprising as it might seem at first acquaintance that identical practices, such as having the boys stung by vicious ants, are occasionally found in regions as remote as California and Brazil: even the particular method may be a local survival of a wide ancient diffusion. Perhaps most common of all specific ingredients of the rite in America is a whipping of the boys. Possibly this commended itself as combining a test of fortitude and an emotional memento of the counsel imparted. At any rate it evidently became an established part of the puberty rites thousands of years ago, and thus acquired the added social momentum of an immemorial custom in many parts of both North and South America.

192. Secret Societies and Masks

Out of the puberty crisis rite for boys there grew gradually a society of initiates who recruited their ranks by new initiations. As emphasis shifted from the individual to the community as represented by those already initiated, the ceremony came to be performed less for the benefit of the individual than for the maintenance of the group, the society as such, with its rites, secrets, and privileges. Very often, no one was excluded but immature boys and females; yet, if the act of admittance was to have any psychic significance, the exclusion of these elements of the community had to be made much of. Thus secrecy toward women and children was emphasized, although often the secrets simmered down largely to the fact that there were secrets.

The girls' adolescence ceremony does not seem to have taken this course of growth, because of its more personal and bodily character, puberty in women being so much more definite a physiological event. There are women's societies among some American tribes. But they seem to be generally a weaker imitation of the men's societies after these were fully developed, not a direct outgrowth of the original girls' rite.

Shamanism entered as another strain into the formation of the secret society. Medicine-men often would come to act for the public good, the occasion would be repeated regularly, and a communal ceremony with an esoteric nucleus resulted. Also, the shamans at times helped the novice shamans train and consolidate their spiritual powers. The extension of this habit perhaps sometimes led, or contributed, to the establishment of a secret society (§ 158).

Masks are closely associated with secret societies. They disguise the members to the women and boys, who are told, and often believe, that the masked personages are not human beings at all. Of course this adds to the mystery and impressiveness of the initiations, especially when the masks are fantastic or terrifying. Masks and societies thus are two related aspects of one thing. But they are by no means inseparable. There are tribes, like some of the Eskimo, who use masks but can scarcely be said to possess societies, while in the Plains and elsewhere there are definite societies that initiate without masks. Physical and economic conditions in the Arctic operating against large-scale community life or social elaboration, the masks of the Eskimo may represent merely that part of a mask-society "complex" which these people could conveniently take over when the complex reached them.

In the Southwest, among the Pueblos, there are two types of societies. There is a communal society, embracing all adult males, who are initiated at puberty by whipping and who later wear masks to impersonate spirits and dance thus for the public good. There are several smaller societies, also with secret rites, which cure sickness, recruit their membership from the cured, and use masks little or not at all. It is clear here how the two component strains, namely crisis rites and shamanistic practices, have flowed into the common mold of the society idea and become patterned by it without quite amalgamating.

193. PRIESTHOOD

This, then, was the second general stage of American religion. The third is marked by the development of the priesthood. The priest is an official recognized by the community. He has duties and powers. He may inherit, be elected, or succeed by virtue of lineage subject to confirmation. But he steps into a specific office which existed before him and continues after his death. His power is the result of his induction into the office and the knowledge and authority that go with it. He thus contrasts sharply with the shaman—logically at least. The shaman makes his position. Any person possessed of the necessary mediumistic faculty, or able to convince a part of the community of his ability to operate supernaturally, is thereby a shaman. His influence is essentially personal. In actuality, the demarcation cannot always be made so sharply. There are peoples whose religious leaders are borderline shaman-priests. Yet there are other tribes that align clearly. The Eskimo have pure shamans and nothing like priests. The Pueblos have true priests but no real shamans. Even the heads of their curing societies, the men who do the doctoring for the community, are officials, and do not go into trances or converse with spirits.

Obviously a priesthood is possible only in a well constructed society. Specialization of function is presupposed. People so unorganized as to remain in a pre-clan condition could hardly be expected to have developed permanent officials for religion. As a matter of fact they have not. There are not even clear instances of a full fledged priesthood among patrilinear sib tribes. The first indubitable priests are found among the matrilinear Southwesterners and a few of their neighbors. Thence they extend throughout the region of more or less accomplished political development in Middle America. Beyond that, they disappear.

Here once more, then, we encounter a trait substantially confined to the area of intensive culture and evidently superimposed upon the preceding stages. This makes it likely that the second stage, that of societies and masks, originated in the same center, but so long ago as to have been mostly obliterated by later developments, while continuing to flourish half way to the peripheries.

Even the priesthood is old in Middle America. This seems reasonably demonstrable. We do not know its actual beginnings there. But its surviving conditions at the edge of its area of occurrence may be taken as roughly indicative of its origin. Among the Pueblos, each priest, with his assistants, is the curator of a sacred object or fetish, carefully bundled and preserved. The fetish serves the public good, but he is its keeper. In fact he might well be said to be priest in virtue of his custodianship thereof. Associated is the concept of an altar, a painting which he makes of colored earth or meal. In the Plains area, some tribes may be somewhat hesitatingly described as having a priest or group of old men as priests. Wherever such is the case, these half-priests are the keepers of fetish-bundles; usually they make something like an altar of a space of painted earth. Areas as advanced as the Northwest Coast, where distinctive priests are wanting, lack also the bundles and altars. It looks, therefore, as if the American priesthood had originated in association with these two ceremonial traits of the fetish bundle and painted altar—both of which are conspicuously unknown in the eastern hemisphere.

194. Temples and Sacrifice

In Middle America the fetish bundle and picture altar do not appear, apparently through supersedence by elements characteristic of the next or fourth cult stage, characterized by the temple and the stone altar used in sacrifice. Temples, however, were already in luxuriant bloom among the Maya in their Great Period of 400 to 600 A. D. The beginnings of their remarkable architecture and sculpture must of course lie much farther back; certainly toward the opening of the Christian era, very likely earlier. Before this came the presumptive initial stage of priesthood, with bundles and altar paintings or some local equivalent. If a thousand years be allowed for this phase, the commencement of the priesthood would fall in southern Mexico or Guatemala at least three thousand years ago; possibly much longer. Peru, perhaps, did not lag far behind.

Temples mark the last phase of native American religion, but the most purely religious characteristic of the period, independent of mechanical or æsthetic developments, is human sacrifice. This had long been practised by the Mayas and in Peru, but reached its culmination in the New World and probably on the planet, at least as regards frequency and routine-like character, among the Aztecs. These were a late people, by their own traditions, to rise to culture and power, attaining to little consequence before the fourteenth century. It looks therefore as if human sacrifice had been a comparatively recent practice, perhaps only one or two thousand years old when America was discovered, and still moving toward its peak.

Outside Middle America, human sacrifice was virtually nonexistent. There was considerable cannibalism in the Tropical Forest and Antilles, but no taking of life as a purely ceremonial act. For the Pueblos of the Southwest, there are some slight and doubtful suggestions, but it appears that such deaths as were inflicted were rather punishments than offerings. The one North American people admittedly sacrificing human life were the Pawnee, a Plains tribe, who once a year shot to death a girl captive amid a ritual reminiscent of that of Mexico. This has always been interpreted as suggestive of a historical connection with Mexico. In fact, the Pawnee appear to have moved northward rather recently, and most of their Caddoan relatives had remained not far from the Gulf of Mexico when discovered.

The precise origin of sacrifice is obscure, although it is significant that it was restricted to the area of concentrated population and towns. In Mexico at least there were no domesticated mammals available. The ultimate foundation of human sacrifice is no doubt the widespread and very ancient custom of offerings. It is, however, a long leap from the offering of a pinch of tobacco, a strew of meal, an arrowpoint or some feathers, or even a few bits of turquoise, to the deliberate taking of a life. Possibly the idea of self-inflicted torture served as a connection. The Plains tribes sometimes hacked off finger joints as offerings, and in their Sun Dance tore skewers out of their skins. In the northern part of the Tropical Forest knotted cords were drawn through the nose and out of the mouth—a sufficiently painful process—in magico-religious preparation. In Mexico it was common for worshipers to pierce their own ears or tongues, the idea of a blood offering combining with that of penance and mortification.

It may seem strange that so shocking a custom as human sacrifice represented the climax of American religious development. Yet in a few thousand years more of undisturbed growth, it would probably have been superseded. This is precisely what happened in the Old World, which may be reckoned as about four to five thousand years ahead of the New. In the Old World also the really lowly and backward peoples did not sacrifice men. The practice is a symptom of incipient civilization.

195. Architecture, Sculpture, Towns

To construct stone-walled buildings seems a simple accomplishment, especially in an environment of stratified rocks that break into natural slabs. Such flat pieces pile up into a stable wall of room height without mortar, and a few log beams suffice to support a roof. Yet the greater area of the two continents seems never to have had such structures. Stone buildings are confined to Middle America and the Southwest. Outside these regions only the wholly timberless divisions of the Eskimo make huts of stone, and for their winter dwellings they are limited to choice of this material or blocks of snow. The Eskimo hut is tiny, not more than eight or ten feet across, and the weather is kept out not by any skill in masonry or plastering, but by the rude device of stuffing all crevices with sod. The Eskimo style of ''building'' in stone would be inapplicable in a structure of pretension. Made larger, the edifice would collapse.

The art of masonry, like agriculture, pottery, and loom weaving, may therefore be set down as having had its origin in Mexico or Peru, or possibly in both. It shows, however, this peculiarity of distribution: at both ends of the area, among the Pueblos of the Southwest in North America and among the Calchaqui of northwest Argentina in South America, living houses were stone-walled. In the intervening regions, most dwellings were of thatch or mud, public buildings of stone. The Aztec, Maya, and Inca areas have therefore left stone temples, pyramids, palaces, forts, and the like, but few towns; the Pueblo and Calchaqui, only towns.[1] How the Middle Americans were first brought to use stone is not known; but a temple built as such being a more specialized, decorative, organized edifice than a dwelling, as well as involving some degree of communal coöperation, it can safely be regarded as a later type than private dwellings. The occurrence of the stone living houses at the peripheries confirms their priority. Evidently masonry was first employed in Middle America for simple public structures: chiefs' tombs, water works, platforms for worship. In its diffusion the art reached peoples like the Pueblos, who lived in small communities, interred their leaders without great rites, and offered no sacrifices in sight of multitudes. These marginal nations therefore took over the new accomplishment but applied it only to their homes. Meanwhile, however, the central "inventors" of masonry had grown more ambitious and were rearing ever finer and larger structures, until the superb architecture of the Mayas and the consummate stone fitting of the Incas reached their climax.

Stone sculpture grew as an accompaniment. It remained rude in Peru, and chiefly limited to idols, in keeping with the simple, massive style of architecture. But the Mayas covered their structurally bolder and more diversified religious buildings with sculpture in relief and frescoed stucco, and between them set up great carvings of animal and mythical divinities, as well as luxuriantly inscribed obelisks. Their sculpture is æsthetically the finest in America and compares in quality with that of Egypt, India, and China.

Recent excavations in the Southwest have revealed a succession of stages as regards buildings. The first houses in this region may have been thatched or earth-roofed. The earliest in which stone was used were small, dug out a few feet, the sides of the excavation lined with upright rock slabs, and a superstructure of poles or mud-filled wattling added. Then followed a period of detached one-room houses, with rectangular walls of masonry; and finally the stage of drawing these together in clusters and raising them in terraced stories. This whole development can be traced within the area. Yet it by no means follows that it originated wholly within the area. The knowledge of laying stone in courses, the impulse or habit of doing so, might, theoretically, just as well have come from without; and evidently did actually come into the Southwest from Mexico.

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[1] The kiva or estufa of the Southwest, a ceremonial chamber, is a partial exception. Yet even it differs from the living room of the same region chiefly in use. Structurally it may be somewhat larger, or circular instead of rectangular, but does not depart widely from the dwellings. Functionally it is a development of the primitive "men's house," not a temple.

This is a type of situation frequently encountered in culture history problems. A group of data seem to point to a spontaneous origin on the spot so long as they are viewed only locally, whereas a broader perspective at once reveals them as merely part of a development whose ultimate source usually lies far away. For instance, the backward Igorot tribes of the interior Philippines rear imposing terraces for their rice plots; their more advanced coastal neighbors do not. It has therefore been debated whether the Igorot invented this large-scaled terracing or learned it from the Chinese. Yet the terracing is only an incident to rice culture, which is widespread in the Orient, ancient, and evidently of mainland origin. The knowledge of terracing was therefore no doubt long ago imported into the Philippines along with rice cultivation, and the Igorot only added the special local development of carrying the terraces to a more impressive height. There is no question that the increase and better concatenation of knowledge is gradually leading to more and more certain instances of wide diffusions and fewer and fewer cases of independent origin.

Town life possesses a material aspect—that of the type and arrangement of dwellings—as well as the social and political aspects already touched on. The largest towns in America were those of Mexico and Peru, whose capitals may have attained populations of fifty to a hundred thousand. The Maya towns were smaller, in keeping with the Maya failure to develop an empire. The largest towns of the Chibcha of Colombia may have held ten or twenty thousand souls. The most flourishing pueblos of the Southwest seem never to have exceeded three thousand inhabitants. The Calchaqui towns in Andean Argentina were no larger, probably smaller. Southeastern and Northwest Coast towns ran to hundreds instead of thousands of population. These figures tell the usual story of thinning away from center to peripheries.

But local differences were sometimes significant. The Southeastern town, except for its court and rude public buildings, was straggling and semi-rural compared with the compact, storied, and alleyed Southwestern pueblo; often it was less populous. Yet its political and military development was more advanced, at any rate as a unit in the larger group of the confederacy.

196. METALLURGY

The use of metals in America falls into three stages. The peripheral and backward areas, such as Patagonia and California, and those parts of the Tropical Forest in which nature had denied a supply and remoteness had shut off trade, did wholly without metals.

In the areas of medium advancement, like the Northwest, Southwest, and the ancient Mound Builder region of the Ohio Valley, native copper was beaten out into sheets, trimmed, bent, gouged, and engraved. It was not smelted from ore nor cast. Its treatment was thus essentially by stone age processes. Gold, silver, and other metals were not used; iron only sporadically when it could be obtained in the native metallic state from a fallen meteorite. The supply even of copper was rarely large. It flowed in trade, much like precious stones among ourselves, to the wealthier groups of nations able to part with their own products in exchange for this substance prized by them for jewelry and insignia but rarely made into tools.

The third stage is that of true metallurgical processes, and is confined to the three Middle American areas. Here, copper, gold, silver, and so far as they were available tin and platinum, were sought after and worked. Copper at any rate was extracted from its ores by smelting; all the known metals were fused and cast, both in permanent molds and by the method of melting wax out of a single-time mold. Wire was beaten or drawn out; gold leaf and acid plating practised; and welding, hardening by hammering, and self-soldering were known. Alloys were made: copper-tin bronze in Bolivia and the south

Peruvian highland, whence its use later spread north, perhaps being carried as far as Mexico (§ 108); copper-arsenic bronze and copper-silver alloy on the Peruvian coast; copper-gold in Colombia and Mexico; copper-lead bronze in Mexico.

Nowhere, however, was metal the standard material for tools, which continued to be mostly of stone or wood. Metallic tools and utensils, especially knives and axes, were not altogether rare in the bronze region of South America. The superior hardness of bronze as compared with copper no doubt proved a stimulus in this direction. But Maya temple-cities were built with stone tools, and the Aztecs cut and fought with obsidian. In general, metal remained treasure or ornament. There were not even the beginnings of an iron culture anywhere in the hemisphere.

In the larger outlines, the history of American metallurgy is thus simple enough, as something developed late and never diffused beyond the central region of intensive culture. As to the sequence of use of the several metals and processes, on the other hand, rather little has been ascertained. It seems that in these matters South America might have been somewhat in advance of Mexico, both in time and in degree of attainments. The age of the metallurgical arts in Middle America must not be underestimated. In spite of their relative recency, they can hardly have been less than several thousand years old.

197. CALENDARS AND ASTRONOMY

The earliest stage of anything like time reckoning in America was what might be called the descriptive moon series. The return of the seasons marked the year. Within the year, rude track was kept of the passage of time by following a series of "natural" months or lunations named after events, such as "heavy cold," "flying geese," "deer rutting," or "falling leaves." No one cared and perhaps no one knew how many days there were in a moon, let alone in a year. No one knew his age, nor, as a rule, how many years ago any event had taken place. It is a mark of pretty high civilization when people know how old they are.

From the point of view of accuracy, the moon series calendar left much to be desired, since there are something over twelve and considerably under thirteen visible lunations in a solar or seasonal year. Some tribes allowed twelve moons, others thirteen, in some different individuals disagreed. Whenever the geese actually flew, debates were settled: it was flying geese month, and every one went on with the series from there. If he had happened to get a moon ahead or behind, he accepted the event as a correction.

The moon series calendar was used by the majority of tribes in the United States and Canada.

Somewhat more advanced is the solstitial moon series. This takes one of the solstices, usually the one just before our Christmas, as the fixed beginning and end of the year. The days are noticeably shortest then. Some tribes went farther and employed landmarks to observe the place on the horizon of the sun's rising. Until the solstice this place shifts daily southward, after it northward. Also, the noonday shadows fall longest at the winter solstice. Here then was a point in the year which was always the same, whereas the geese might fly or the leaves fall early one year and late the next. The definiteness thus obtained was followed up by numbering the moons instead of describing them, or by recognizing both solstices as a frame within which there fell two parallel groups of six moons, or of five moons and a slightly longer solstitial period.

This method also did not solve the really difficult problem of making twelve lunations and an irregular fraction fit automatically and permanently into the solar year; and provision for counting days and years was still wholly lacking. Yet the first beginnings of exact astronomical observations had been made and were utilized to give the year and its subdivisions a certain fixity.

The occurrence of the simple solstitial calendar in North America is significant. It occurs in the Southwest and Northwest: that is, in the area most directly influenced by the higher Mexican center, and the area which made most progress independently of Mexico.[1]

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[1] Some of the Eskimo followed a solstitial reckoning also, but probably as a result of the unusual astronomical phenomena of their high latitudes rather than as the consequence of cultural influence.

These two stages of the descriptive and the solstitial moon series were long ago passed through in southern Mexico and a need felt for a more precise time reckoning. No calendar can either serve accuracy or cover long periods which fails to concern itself with the exact arithmetical relation of its smaller units to its larger ones: the number of days in the month and year, for instance. This concern would not be difficult if the relations were simple; but nature has put something over 29½ days into a lunation, something under 365¼ days and a little over 12⅓ lunations into the year. The first step ahead was undoubtedly a day count, as previously the numbering of the moons had marked an advance over their descriptive naming. The day count must have revealed the discrepancy between the actual numbers and those assumed for the larger units, such as 30 and 360. A great advance was therefore made when the natural lunation was wholly abandoned and artificial units substituted. The Mayas, or possibly some previous and forgotten people, invented a "month" of twenty days, probably because they counted by twenties instead of tens. Eighteen of these months, with five added leap days, made a 365-day year. Thirteen 20-day months made another and wholly arbitrary period of 260 days, which the Aztecs, who borrowed the system, called tonalamatl.[1] The tonalamatl had no basis in nature or astronomy and was a pure invention: a reckoning device. It ran its course concurrently with the year as two wheels of 260 and 365 cogs might engage. The same cogs would meet again at the end of 73 and 52 revolutions respectively, that is, 365 and 260 divided by 5, their highest common factor. At the end of each 52 years, therefore, the beginning of the year and of the tonalamatl again coincided, giving a "calendar round" of that duration. This 52-year period is the one by which the Aztecs dated.

The Mayas, however, did not content themselves with the 52-year period, but reckoned time by katuns of 20 and cycles of 400 years.[2] The dates on Maya inscriptions are mostly from their ninth cycle, with some from the end of the eighth and beginning of the tenth. This period corresponds approximately to the first six centuries of the Christian era. The beginning of the first cycle would fall more than 3,000 years before Christ. There is no reason to believe that this time reckoning began then. It is more likely that a little before the time of Christ the Mayas perfected this system of chronology and gave it dignity by imagining some seven or eight cycles to have passed between the beginning of the world, or some other mythological event, and the actual commencement of their record. From the close of their eighth cycle, however, the dates are apparently contemporary with the events to which they refer.

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[1] The tonalamatl was not divided into 13 discrete month periods of 20 days each, but was a permutation system of 20 names with 13 numbers, yielding a recurrent cycle of 260 days each designated by its particular combination of name and number. See § 106.

[2] The years in this reckoning were somewhat short: 360 days.

This system is so elaborate that it could scarcely have been devised and adopted all at once. There must have been a time lasting some centuries, perhaps over a thousand years, previous to the Christian era, during which the first day count was being elaborated and perfected into the classical calendar of the early post-Christian Maya monuments.

This calendar did not exhaust the astronomical and mathematical accomplishments of the Mayas. They ascertained that eight solar years correspond almost exactly with five ''years'' or apparent revolutions (584 days) of the planet Venus, and that 65 Venus years of a total of 37,960 days coincide with two calendar rounds of 52 solar years. They knew that their 365-day year was a fraction of a day short of the true year, determined the error rather exactly, and, while they did not interpolate any leap days, they computed the necessary correction at 25 days in 104 years or two calendar rounds. This is greater accuracy than has been attained by any calendar other than our modern Gregorian one. As regards the moon, they brought its revolutions into accord with their day count with an error of only one day in 300 years. These are high attainments, and for a people without astronomical instruments involved accurate and protracted observations as well as calculatory ability.

Much less is known of South American calendars; but, like the dwindling away from Maya to Aztec to Pueblo and finally to the rudiments of the descriptive moon series of the backward tribes in the northern continent, so there is discernible a retardation of progress as the Maya focus is left behind toward the south. The most developed calendar in South America was that of the Chibchan peoples of Colombia. Beyond them, the Inca, in their greater empire, got along with a system intermediate in its degree of development between the Aztec and the Pueblo ones. In the Tropical Forest and Patagonian areas there do not seem to have been more than moon name series comparable to those of peripheral North America.

198. WRITING

Related to calendar and mathematics in its origin was writing, which passed out of the stage of pictographs and simple ideograms only in the Mexican area. The Aztecs used the rebus method (§ 130), but chiefly for proper names, as in tribute lists and the like. The Mayas had gone farther. Their glyphs are highly worn down or conventionalized pictures, true symbols; often indeed combinations of symbols. They mostly remain illegible to us, and while they appear to contain phonetic elements, these do not seem to be the dominant constituents. The Maya writing thus also did not go beyond the mixed or transitional stage. The Chibcha may have had a less advanced system of similar type, though the fact that no remains of it have survived argues against its having been of any considerable development. The Peruvians did not write at all. They scarcely even used simple pictography. Their records were wholly oral, fortified by mnemonic devices known as quipus, series of knotted strings. These were useful in keeping account of numbers, but could of course not be read by any one but the knotter of the strings: a given knot might stand equally for ten llamas, ten men, ten war clubs, or ten jars of maize. The remainder of South America used no quipus, and while occasional pictographs have been found on rocks, they seem to have been less developed, as something customary, than among the North American tribes. All such primitive carvings or paintings were rather expressions of emotion over some event, concrete or spiritual, intelligible to the maker of the carving and perhaps to his friends, than records intended to be understood by strangers or future generations.

Connected with the fact that the highest development of

American writing took place in southern Mexico, is another: it was only there that books were produced. These were mostly ritualistic or astrological, and were painted on long folded strips of maguey fiber paper or deerskin. They were probably never numerous, and intelligible chiefly to certain priests or officials.

199. The Several Provincial Developments: Mexico

Since the calendrical and graphic achievements enumerated, together with temple sculpture, lie in the fields of science, knowledge, and art, and since they show a definite localization in southern Mexico, in fact point to an origin in the Maya area, they almost compel the recognition of this culture center as having constituted the peak of civilization in the New World.

This localization establishes at least some presumption that it was there rather than in South America that the beginnings of cultural progress, the emergence out of primitive uniformity, occurred. To be sure, it is conceivable that agriculture and other inventions grew up in Andean South America, were transported to Mexico, for some reason gained a more rapid development there, until, under the stimulus of this forward movement, further discoveries were made which the more steadily and slowly progressing Peruvian motherland of culture failed to equal. Conjectures of this sort cannot yet be confirmed or disproved. Civilization was sufficiently advanced in both Mexico and Peru to render it certain that these first beginnings now referred to, lay some thousands of years back. In the main, Mexican and Peruvian cultures were nearly on an equality, and in their fundamentals they were sufficiently alike, and sufficiently different from all Old World cultures, to necessitate the belief that they are, broadly, a common product.

Still, the superiority of the Mexicans in the sciences and arts carries a certain weight. If to this superiority are added the indications that maize and cotton were first cultivated in the south Mexican area, in other words, that the fundamentals of American agriculture and loom-weaving seem more likely to have been developed there than elsewhere; and if further the close association of pottery with agriculture throughout the western hemisphere is borne in mind, it seems likely that the seat of the first forward impetus out of the wholly primitive status of American culture is to be sought in the vicinity of southern Mexico.

200. The Andean Area

The triumphs of Mexican civilization were in the spiritual or intellectual field; those of Peru lay rather in practical and material matters. The empire of the Incas was larger and much more rigorously organized and controlled, their roads longer and more ambitious as engineering undertakings, their masonry more massive; their mining operations and metal working more extensive. The domestication of the llama and the cultivation of certain food plants such as the potato gave their culture an added stability on the economic side.

The extent of the Inca empire, and of the smaller states that no doubt preceded it, was of influence in shaping Andean culture. Organized and directed efforts of large numbers of men were made available to a greater degree than ever before in the New World. The empire also operated in the direction of more steady industry, but its close organization and routine probably helped dwarf the higher flights of the mind. In the quality of their fabrics, jewelry, stone fitting, and road building, as well as in exactness of governmental administration, the Peruvians excelled. It is remarkable how little, with all their progress in these directions, they seem to have felt the need of advance in knowledge or art for its own sake. They thought with their hands rather than their heads. They practised skill and inhibited imagination.

The Incas, like the Aztecs in Mexico, represent merely the controlling nation during the last stage of development. Their specific culture was the local one of the highlands about Cuzco. Prehistoric remains from the coast both north and south, and in the Andean highland southward of Cuzco in the vicinity of Lake Titicaca and the adjacent parts of Bolivia, demonstrate that this Inca or Cuzco culture was only the latest of several forms of Andean culture. At the time of Inca dominion, the great temple of Tiahuanaco near Lake Titicaca was already a ruin. Pottery of a type characteristic of the Tiahuanaco district, and similar in style to its stone carvings, has been found in remote parts of the Andean area, thus indicating the district as an early center of diffusion. Other centers, more or less contemporaneous, some of them perhaps still earlier, can be distinguished along the coast. In short, the inner history of the Andean region is by no means summed up in that picture of it which the Inca domination at the time of discovery presented. New scientifically conducted excavations throughout the area will no doubt unravel further the succession of local cultural developments.

201. Colombia

The Chibchas of Colombia, the intermediate member of the three-linked Middle American chain, fell somewhat, but not very far, below the Mexicans and Peruvians in their cultural accomplishments. Their deficiency lay in their lack of specific developments. They do not show a single cultural element of importance peculiar to themselves. They chewed coca, slept in hammocks, sat on low chairs or stools; but these are traits common to a large part of South America. Consequently the absence or weak development of these traits in Mexico is no indication of any superiority of the Chibchas as such. The great bulk of Colombian culture was a substratum which underlay the higher local developments of Mexico and Peru; and this substratum—varied agriculture, temples, priesthood, political organization—the Chibchas possessed without notable gaps. Whatever elements flowed from Mexico to Peru or from Peru to Mexico at either an early or a late period, therefore probably passed through them. In isolated matters they may have added their contribution. On the whole, though, their rôle must have been that of sharers, recipients, and transmitters in the general Middle American civilization.

202. The Tropical Forest

The line of demarcation between the narrow Pacific slope of South America and the broad Atlantic drainage is sharp, especially in the region of Peru. The Cordilleran stretch is arid along the coast, sub-arid in the mountains, unforested in all its most characteristic portions. East of the crest of the Andes, on the other hand, the rainfall is heavy, often excessive, the jungle thick, communication difficult and largely dependent on the waterways. Even the Caucasian has made but the slightest impression on the virgin Amazonian forest at its densest. The Inca stretched his empire a thousand miles north and a thousand to the south with comparative ease, establishing uniformity and maintaining order. He did not penetrate the Tropical Forest a hundred miles. At his borders, where the forest began, lived tribes as wild and shy as any on earth. The Andean civilization would have had to be profoundly modified to flourish in the jungle, and the jungle had too little that was attractive to incite to the endeavor. Some thousands of years more, perhaps, might have witnessed an attempt to open up the forest and make it accessible. Yet when one recalls how little has been done in this direction by Caucasian civilization in four centuries, and how superficial its exploitation for rubber and like products has been, it is clear that such a task would have been accomplished by the Peruvians only with the utmost slowness.

Yet various culture elements filtered over the Andes into the hidden lowlands. The Pan's pipe, for instance, an element common to the Andes and the Forest, is likely to have originated in the higher center. Elements like the blowgun, the hammock, the chair or stool, are typical of the northern Forest and Antilles, and may have infiltrated these areas from Colombia or even been locally developed. The same is true of the cultivation of the cassava or manioc plant, from which we draw our tapioca. This, the great staple of the Forest region, is better adapted to its humid climate than is maize, which flourishes best in a subarid environment. Cassava may therefore be looked upon as perhaps a local substitute for maize, evolved as a domesticated plant under the stimulus of an already established maize agriculture. Its cultivation has evidently spread through the Forest region from a single source, since the specialized processes of preparing it for food—the untreated root is poisonous—are relatively uniform wherever it is grown. Maize is not unknown in the area, but less used than cassava wherever the forest is dense.

A characteristic quality of those Forest culture-traits which are not common ancient American inheritance, is that, whether of Middle American or local origin, they are detached fragments, particular devices having little or no relation to one another, like the hammock and the blowgun, or cassava and the Pan's pipe. Original fundamental processes, higher accomplishments necessitating order or organization of effort, are lacking. This is precisely the condition which might be anticipated when a culture too low to take over a higher one in its entirety had borrowed from it here and there, as the Forest peoples undoubtedly have borrowed from Middle America.

Three districts within the Forest area have previously been mentioned (§ 174) as regions in which the forest becomes open or disappears, and whose type of culture is locally modified: Guiana, eastern Brazil, and the Chaco. Of these the Brazilian highlands constitute an area of unusually deficient culture. In parts of them agriculture and pottery seem to be lacking. These highlands are perhaps to be construed as an interior marginal region representing an isolation within the greater Forest area. Had these highlands been in juxtaposition to the Andean area, or even situated near it, they would presumably have been able to take over Andean culture elements more successfully than the low-lying Forest, and would then have stood out from this through superiorities instead of absences. Their remoteness, however, enabled the intervening Forest region to shut them off from Andean influences of consequence, while giving to them only part of its own low cultural content.

The peculiarities of the Chaco are due to the opposite reason. The Chaco is a partly open country at the southerly extremity of the Forest. It lies close to the foot of the Andes where these broaden out into the southern Bolivian plateau. It also shades off into the treeless Patagonian region. It is thus open to influences from three sides, and its culture appears to represent a mixture of the three adjacent ones. The basis would seem to be the culture of the Tropical Forest, but definite Patagonian as well as Andean elements are traceable.

203. Patagonia

Patagonia is par excellence the peripheral region of South America, culturally as well as geographically. As regards civilization, this is true in the highest degree at the extreme tip of the continent about Tierra del Fuego. Many of the most widely spread South American culture traits being lacking here, there is a curious resemblance to the northerly tribes of North America.

Yet even this culturally disinherited area is not without a few local developments of relatively high order. The most striking is the plank-built canoe of the south Chilean archipelago. The skill to carpenter such boats was exercised in only one other region in the hemisphere; the Santa Barbara Islands of California. Curiously enough the latter is also a district of comparatively backward culture. In any event this built-up canoe of the rude people of the extreme south contrasts strikingly with the lack of any real boats among the advanced nations in the Andean area. The moral would seem to be that it is speculative to base much theory or explanation on any single culture trait.

Of other elements specific to the Patagonian region, there might be mentioned coiled basketry (§ 104) and the bolas. This is a hunting weapon of three stones attached to ropes swung so as to wind around the neck or legs of game. Except at the extreme south, Patagonian culture was profoundly modified by the introduction of the horse, which soon after the arrival of the Spaniards multiplied on the open plains. The horse enlarged the ability of the Patagonian tribes to take game, especially in the Pampas in the north, increased their wealth, and strengthened their warlike interests. The same change occurred in the Chaco.

204. North America: the Southwest

In North America the Southwest area lies at the point where the continent spreads out fanwise. It is therefore the gate or transforming station through which Mexican influences flowed on their way to the various areas beyond. Whatever of Mexican culture the Pueblos received and accepted, they worked over before they passed it on. This reconstitution gave the culture a new color. Nearly every one on first coming in contact with Southwestern culture has been struck with its distinctive cast. Analysis, however, shows few intrinsic elements peculiar to it.

The novelty as compared with Mexico lies in a different emphasis or a new arrangement of the elements. Masonry, for instance, is used for dwellings instead of temples. Town life is well developed, but the political organization which accompanies it in Mexico is much weaker in the Southwest.

205. The Southeast

Superficially, Southeastern culture appears different from Southwestern. Much of the seeming difference is due to the wooded and rather humid environment; another portion is accounted for by the failure of the Southeastern tribes to build in stone. But there are differences that go deeper, such as the poverty of Southeastern ritual and the comparative strength of political organization. The religious dwarfing may be attributed to greater distance from Mexico.

The precise routes of diffusion into the Southeast are not wholly clear. The culture center of the area lay on or near the lower Mississippi—sufficiently close to the Southwest. Yet the district which is now Texas intervened, and this was one of distinctly lower culture, largely occupied by tribes with Plains affiliation. Theoretically it would have been possible for cultural elements to travel from Mexico along the Texas coast to the Southeast. Yet what little is known about the tribes of this coast indicates that they were backward. A third possibility for the transmission of culture was from the Antilles, especially by the short voyage from Cuba or the Bahamas to the point of Florida. Some connections by this route almost certainly took place. But they seem to have affected chiefly the peninsula of Florida, and to have brought less into the Southeast as a whole than reached it overland.

206. The Northern Woodland

The Northeast was historically dependent on the Southeast as this was on the Southwest and the Southwest on Mexico. It was thus the third stage removed from the origins in Middle America. It was inferior to the Southeast in several points. Pottery was cruder, clans mostly patrilinear instead of matrilinear, town and tribal life less organized. Some exceptions within the Northeast can be traced to direct influences or migrations from the Southeast. The matrilinear and confederated Iroquoian tribes of the Northeast, for instance, were linguistic relatives of the Cherokee in the Southeast.

A similar movement of culture or peoples, or both, occurred at an earlier time and has left as its remains the mounds of the Ohio valley—local equivalents of the Mexican temple pyramid. Some of these are of surprising bulk, and others have the form of animals. Associated with them are earthwork fortifications which indicate coherent populational groups of some size. The industries of the Mound Builders were also on a somewhat higher level, especially as regards artistic quality, than those of the historic tribes of the region. In detail the Mound Builder culture represents many interesting points that remain to be cleared up. In the large, however, it was a temporary local extension of the Southeastern culture, from which flowed its occasional resemblances to Middle America.

207. Plains Area

The Plains area is adjacent to the Southwest, but a review of its culture elements shows that a surprisingly small fragment of Southwestern civilization penetrated it. The most advanced Plains tribes seem rather to have been in dependence on the Southeast. This is probably to be explained as the result of a flow of culture up the more immediate Mississippi valley. The western Plains, close to the Rocky mountains, were sparsely populated in aboriginal times, and life there must have been both unsettled and narrow in its scope. Contacts between these western Plains and the Southwest no doubt existed, but presumably the Plains tribes were too backward, and too engrossed in their own special adaptation to their environment, to profit much by what they might have borrowed from the Pueblos.

Certain specific culture traits were developed on the Plains. The nearly exclusive dependence on buffalo stunted the culture in some directions, but led to the originating of other features. Thus the Plains tribes came to live in tipis—tents made of the skin of the buffalo—pitched these in regular order in the camp circle, and traveled with the bundled tents lashed to a "travois" frame dragged by dogs. While they never accomplished anything notable in the way of confederating themselves into larger stable groups, nor even in effective warfare, they did develop a system of "coup counting" or military honors which loomed large in their life.

During the seventeenth century the horse was introduced or became abundant on the Plains. It reached the Indians from Spanish sources, as is shown by their adopting modifications of Spanish riding gear and methods of mounting. The horse gave them an extension of range and a greater sureness of food supply; more leisure also resulted. The consequence was a general upward swing of the culture, which put it, as regards outward appearances, on a par with the cultures of other areas that in purely aboriginal times had outranked the Plains. This development due to the horse is in many ways comparable to that which occurred in the Patagonian area, but with one difference. The Patagonians possessed a meager culture. The introduction of the horse resulted in their hybridizing two elements so dissimilar as their own low civilization and the Caucasian one. The Plains culture had a somewhat fuller content. The Plains tribes were also protected from intimate Caucasian contacts for nearly two centuries, during which they were able to use the new and valuable acquisition of the horse to enrich and deepen their culture without essentially remodeling it. Horse transport was substituted for dog transport, tipis became more commodious and comfortable, the camp circle spread out larger, more property could be accumulated. Warfare continued to be carried on as a species of game with military honors as prizes, but now provided the added incentive of substantial booty of herds easily driven off.

208. THE NORTHWEST COAST

The North Pacific coast is the most anomalous of the North American areas, and its history is in many ways unique. It is nearer in miles to the Southwest and Mexico than is the Northeast, yet agriculture and pottery never reached it. At the same time the Northwest culture is obviously more than a marginal one. People with so elaborate a social organization as these Coast tribes, and with so outstanding an art, were certainly not peripheral dependents. The explanation is that much of the development of culture in the Middle American region never became established in the Northwest, but that this area manifested a vitality and initiative of its own which led to the independent development of a number of important culture constituents. The art is in the main of such local origin, since it does not affiliate closely with the art of other areas. Very important too was the stress increasingly laid on wealth in the Northwest. Society was stratified in terms of it. The potlatch, a combination of feast, religious ceremony, and distribution of property, is another peculiar outcome of the same tendency. The use of dentalium shells as a sort of standard currency is a further manifestation. The working of wood was carried farther than anywhere else. Several traits, such as the solstitial calendar and matrilinear clans, which the Northwest Coast shares with other areas, have already been cited as probable instances of independent evolution on the spot.

All in all, then, it is necessary to look upon the Northwest Coast culture as one that fell far short of the high civilizations of Middle America, in fact barely equaled that of the Southwest, yet as the only one in the New World that grew to any notability with but slight dependence on Middle America. It is an isolated secondary peak standing aloof from the greater one that culminated in Mexico and Peru and to which all the remainder of the hemisphere was subordinate. Figure 35 visualizes this historic relation.

209. NORTHERN MARGINAL AREAS

The Arctic, Mackenzie, Plateau, and California areas were also but little influenced by Middle American civilization. In fact, most of the elements which they share with it may be considered direct survivals of the general proto-American culture out of which the early Middle American civilization emerged. Yet why these areas on the Pacific side of North America should have profited so much less by the diffusion of Mexican advancement than the areas on the Atlantic, is not clear. In the mostly frozen Arctic and Mackenzie tracts, the hostile environment may have forbidden. But this explanation certainly does not apply to the California area which lies at the very doors of the Southwest and yet refrained from taking over such fundamentals as agriculture and pottery. Sparseness of population cannot be invoked as a cause, since at least along the coast the density of population was greater than in almost all the eastern half of the continent.

Of the people of these four areas, the Eskimo are the only ones that evinced notable originality. It is easy to attribute this quality of theirs to the stern rigor of environment. In fact, it has been customary to appeal to the Eskimo as an example of the popular maxim that necessity is the mother of invention. Yet it is clear that no great weight can be attached to this simple philosophy. It is true that without his delicately adjusted harpoon, his skin boat, his snow hut, his dog sled, and his seal oil lamp, the Eskimo could not have maintained an existence on the terrifically inhospitable shores of the Arctic. But there is nothing to show that he was forced to live in this environment. Stretches of mountains, desert, and tundra in other parts of the world were often left uninhabited by uncivilized peoples. Why did not the Eskimo abandon his Arctic shore or refuse to settle it in the first place, crowding his way instead into some more favorable habitat? His was a sturdy stock that should have had at least an equal chance in a competition with other peoples.

Furthermore it is evident that rigorous environment does not always force development or special cultural adaptations. The tribes of the Mackenzie-Yukon and the most northerly part of the Northeast area lived under a climate about as harsh as that of the Eskimo. In fact they were immediate neighbors; yet their culture is definitely more meager. A series of the most skilled devices of the Eskimo were wanting among them. If necessity were truly as productive a cause of cultural progress as is commonly thought, these Athabascan and Algonkin Indians should have been stimulated into a mechanical ingenuity comparable to that of the Eskimo, instead of continuing to rank below them.

These considerations compel the conclusion that the Eskimo did not develop the achievements of his culture because he lived in his difficult environment, but that he lived in the environment because he possessed a culture capable of coping with it. This does not mean that he had his culture worked out to the last detail before he settled on the American shores of the Arctic ocean. It does mean that he possessed the fundamentals of the culture, and the habits of ingenuity, the mechanical and practical turn of mind, which enabled him to carry it farther and meet new requirements as they came up. Where and how he acquired the fundamentals is obscure. It is well to remember in this connection that the physical type of the Eskimo is the most distinctive in the New World, and that his speech has as yet shown no inclination to connect with any other American language. It is conceivable that the origin of the Eskimo is to be set at a time later than that of the American race and somewhere in Asia. The fact that at present there are Eskimo villages on the Siberian side of Behring Strait is too recent and local a phenomenon to afford strong confirmation of such a view, but certainly does not operate against it. Somewhere in the Siberian region, then, within occasional reach of influences emanating from higher centers of civilization in Asia or Europe, the Eskimo may have laid the foundations of their culture, specialized it further as they encountered new conditions in new Asiatic habitats, and evolved only the finishing touches of their remarkable adaptation after they spread along the northernmost shores of America. Some of the Old World culture influences which had reached them before they entered America may go back to the Magdalenian culture of the Palæolithic. There are at any rate certain resemblances between Magdalenian and Eskimo cultures that have repeatedly impressed observers: the harpoon, spear thrower, lamp, carving, and graphic art (§ 67).

210. LATER ASIATIC INFLUENCES

One set of influences the Eskimo, and to a lesser degree the peoples of adjacent areas, were unquestionably subject to and profited by: sporadic culture radiations of fairly late date from Asia. Such influences were probably not specially important, but they are discernible. They came probably as disjected bits independent of one another. There may have been as many that reached America and failed of acceptance as were actually taken up. In another connection (§ 92) it has been pointed out how the tale known as the ''Magic Flight'' has spread from its Old World center of origin well into northwestern America. A similar case has been made out for a material element: the sinew-backed or composite bow (§ 101), first found some three to four thousand years ago in western Asia. This is constructed, in Asia, of a layer each of wood, sinew, and horn; in its simpler American form, which barely extends as far south as the Mexican frontier, of either wood or horn reinforced with sinew. Body armor of slats, sewn or wound into a garment, seems to have spread from Asia to the Northwest Coast. The skin boat, represented in its most perfect type by the Eskimo kayak; the tipi or conical tent of skins; birchbark vessels; sleds or toboggans with dog traction; bark canoes with underhung ends; and garments of skin tailored—cut and sewn—to follow the contours of the body, may all prove to represent culture importations from Asia. At any rate they are all restricted in America to the part north and west of a line connecting the St. Lawrence and Colorado rivers, the part of the continent that is nearest to Asia. South and east of this line, apparently, Middle American influences were strong enough to provide the local groups with an adequate culture of American source; and, the Asiatic influences being feeble on account of remoteness, Asiatic culture traits failed of acceptance. It is also noteworthy that all of the traits last mentioned are absent on the Northwest Coast, in spite of its proximity to Asia. The presumable reason is that the Northwest Coast, having worked out a relatively advanced and satisfactory culture adaptation of its own, had nothing to gain by taking over these elementary devices; whereas to the culturally poorer peoples of the Arctic, Mackenzie, Plateau, and in part of the California, Plains, and Northeastern areas, they proved a valuable acquisition.

A careful analysis of Eskimo culture in comparison with north and east Asiatic culture may reveal further instances of elements that have spread from one hemisphere to the other. Yet the sum total of such relatively late contributions from the civilization of the Old World to that of the New, during the last one or two or three or four thousand years, is not likely to aggregate any great bulk. Since the early culture importation of the period of the settlement of America eight or ten thousand years ago, the influences of the Old World have always been slight as compared with the independent developments within the New World. Even within the northwestern segment of North America, the bulk of culture would seem to have been evolved on the spot. But mingled with this local growth, more or less modifying it in the nearer regions, and reaching its greatest strength among the Eskimo, has been a trickling series of later Asiatic influences which it would be mistaken wholly to overlook.

CHAPTER XIV

THE GROWTH OF CIVILIZATION: OLD WORLD PREHISTORY AND ARCHÆOLOGY

211. Sources of knowledge.—212. Chronology of the grand divisions of culture history.—213. The Lower and Upper Palæolithic.—214. Race influence and regional differentiation in the Lower Palæolithic.—215. Upper Palæolithic culture growths and races.—216. The Palæolithic aftermath: Azilian.—217. The Neolithic: its early phase.—218. Pottery and the bow. —219. Bone tools.—220. The dog.—221. The hewn ax.—222. The Full Neolithic.—223. Origin of domesticated animals and plants.—224. Other traits of the Full Neolithic.—225. The Bronze Age: Copper and Bronze phases.—226 Traits associated with bronze.—227. Iron.—228. First use and spread of iron.—229. The Hallstadt and La Tène Periods.—230. Summary of development: Regional differentiation.—231. The Scandinavian area as an example.—232. The late Palæolithic Ancylus or Maglemose Period.—233. The Early Neolithic Litorina or Kitchenmidden Period.—234. The Full Neolithic and its subdivisions in Scandinavia.—235. The Bronze Age and its periods in Scandinavia.—236. Problems of chronology. —237. Principles of the prehistoric spread of culture.

211. Sources of Knowledge

The story of the growth and development of culture in the Western Hemisphere which has been sketched in reconstruction in the last chapter is built up from the incomplete information of excavations and the indirect evidence of culture trait distributions and analyses. Earlier than about ten thousand years ago, this hemisphere has no known human history. In the Old World, conditions are doubly different. There is a long primeval record, stretching perhaps a hundred thousand years beyond 8000 B.C., documented much like the subsequent culture history of America, but with a wealth of geological, faunal, and skeletal data to compensate for the loss of ancient cultural evidences in the lapse of time. Secondly, for the last ten thousand years, there is a fuller record than for America. This greater fullness is partly due to the earlier start toward its higher forms which civilization took in the Eastern Hemisphere. And this relatively early advancement brought it about that by 3000 B.C. adequate systems of writing had been achieved in Africa and

Asia, so that contemporary inscriptions have been preserved to throw direct light on the thoughts and institutions of the people of that day, and to date the centuries of their rulers for us. These last five thousand years thus belong to history, rather than to prehistory, in some parts of the hemisphere; and they allow many a close inference as to what happened in the previous five thousand years when writing was as yet unknown or its first systems were being evolved.

These ten thousand years since the close of the Old Stone Age, half of them studied by the methods of anthropology, half also by those of history, and the whole forming the richest field in human culture history, are the subjects of the present chapter and the next.

First, however, it is necessary to refer back to the earliest known development of civilization in the Old Stone Age (Chapter VI), whose close is our present starting point.

212. CHRONOLOGY OF THE GRAND DIVISIONS OF CULTURE HISTORY

The period of human existence since the first tool was made is generally divided into four grand divisions (§ 66, 67): the Palæolithic or Old Stone Age; the Neolithic or New Stone Age; the Bronze Age; and the Iron Age. The duration of these four ages is diverse and notably diminishing from earliest to latest. The last three are comprised within the past ten thousand years: 8000 B.C. may be looked upon as a reasonably accurate date for the commencement of the Neolithic. For western Europe, at least, the probable error of this date is not over one or at most two thousand years. Back of this approximately fixed point stretches the immeasurably longer Palæolithic, for the determination of whose duration there is available not even any semi-historical evidence, and which can only be estimated in terms of geological alterations, continental glaciations, and faunal and floral changes—all unsatisfactory means for arriving at an absolute chronology expressible in years.

To a vague 100,000 B.C. as the tentative figure for the beginning of the Palæolithic, and an approximate 8000 B.C. for the commencement of the Neolithic, there can be added 3000 B.C. for the onset of the Bronze and 1000 B.C. of the Iron Age. The last two dates are averages only. The Greek islands, for instance, received bronze about this period, the Orient had it earlier, western Europe not until about 2500 B.C., northern Europe still later. In the same way, iron is well attested for western Asia in the thirteenth century before Christ, for Central Europe and France about 900 B.C., in Scandinavia some centuries later, in fact becoming abundant only shortly before the Roman period.

In the wide sense, the outstanding generalizations derivable from these figures are twofold. As regards the later periods, those of metal and probably the Neolithic, the west lagged behind the east, the north behind the south; Asia preceded and invented, Europe followed and imitated. As regards the entire duration, a tremendous disproportion is observable. The vast bulk of the total time of culture is covered by the Palæolithic: the three following Ages are all squeezed into a tenth of the whole. Within this fraction again the Neolithic takes up half, leaving the two metal Ages to divide the other half between them. There is a clear tendency toward acceleration of development.

213. The Lower and Upper Palæolithic

Within the Old Stone Age, a primary division is to be made between the Lower and Upper Palæolithic. The Lower Palæolithic comprises the Chellean, Acheulean, and Mousterian periods, when Europe was inhabited by Neándertal man, who was distinct from the modern human species, and possibly by a pre-Neandertal race not yet discovered. The Upper Palæolithic, or Reindeer Age, consists of the Aurignacian, Solutrean, and Magdalenian, with the Azilian as epilogue. Through these Upper Palæolithic periods long-headed branches of *Homo sapiens*—ourselves—existed: the Cro-Magnon, Grimaldi, and Brünn types, some of them foreshadowing the existing Caucasian and Negroid races (§ 14, 16-18). The longest step forward in the development of European Palæolithic civilization comes in the passage from its Lower to its Upper phase. Before this transition, new achievements were rare and their total small. The use of fire, of flint cores and flakes, of fracturing and retouching, possibly the use of wooden handles, a minimal employment of bone, and a definite disposal of the dead, about sum up known human attainments to the end of the Lower Palæolithic (§ 81).

Compared with this stock of culture, that of the Upper Palæolithic is elaborate. Bone awls and weapon points; shell necklaces and armlets; clothing; painting of the dead; sculpture and engraving—a greater number of elements than the Lower Palæolithic had been able to accumulate in perhaps 75,000 years—appear in the Aurignacian. The foundations of the whole of the Upper Palæolithic civilization were laid in this period. That the Solutrean added needles and surface retouching of flint, the Magdalenian a more vigorous development of pictorial line and use of colors, lamps, harpoons, and spear throwers, represented in the main only an enriching of the general Upper Palæolithic culture, whose essentials were determined at the outset.[1]

214. Race Influence and Regional Differentiation in the Lower Palæolithic

This profound change raises a natural conjecture. The Lower Palæolithic culture, at least in its latest form, was carried by Neandertal man; Upper Palæolithic culture is in great part associated with Cro-Magnon man, whose anatomy was nearer our own. Did not this relatively modern structure involve also a relatively modern set of mental faculties, and these in turn, by their own sheer worth, produce the richer culture? The supposition is plausible enough, and has been made. But it is sounder procedure to withhold commitment of opinion. The inference involves the assumption that approach to our own bodily type is accompanied by higher native intelligence; and the further assumption that higher intelligence will automatically produce advance in civilization. Probable as both these assumptions may seem, they are still undemonstrated, in general and in particular. The application of the assumptions to the facts therefore gives an apparent explanation in terms of an ultimate but really unknown causality. By accepting this hypothetical causality, it turns attention away from the question of its validity. But the validity of the causal relation between the body and intelligence, and between intelligence and culture, is precisely a point that needs elucidation. It needs elucidation as much as does the change of civilization that occurred in Europe about 25,000 years ago; and is a much broader problem—indeed, part of the most fundamental problem that anthropology still faces as unsolved. Instead of a snapping interpretation of a dubious point in human history in terms of a couple of still more dubious principles, it will be wiser to lay these principles aside, for a time at least, and to reconsider more intensively the facts bearing on the particular point at issue.

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[1] So primary is the distinction within the Palæolithic of its Lower and Upper halves, that some authors, for purposes of elementary presentation, have felt justified in calling these halves the Old and the Middle Stone Ages. This is unfortunate because this "Middle" Stone Age is in scientific writings always included in the Palæolithic, whereas the Mesolithic or Middle Stone Age of many archæologists embraces the more or less transitional periods such as the Azilian and Maglemose (below, § 216) between the end of the Palæolithic and the definitive or Full Neolithic. Nevertheless, the unorthodox terminology has the merit of condensing detail with a broad sweep.

There are two obvious lines of evidence that may help to throw light on the change from the Lower to the Upper Palæolithic, and in fact aid understanding of the whole Palæolithic. The first comprises the relations between western Europe and other areas during that period; the second, regional differences within Europe. In the previous chapter on the Palæolithic, such considerations have been disregarded in favor of a schematic presentation of what seemed the salient facts in a field made sufficiently difficult by the antiquity and incompleteness of data. The best of these data, and those which arrange themselves most systematically, are those from Europe, which have therefore been presented as if they constituted a self-sufficient unit. But it is unlikely that the culture should have developed in Europe in complete detachment for a hundred thousand years or that it should have remained identical over the whole of that continent. It is necessary, in short, to revise the simple outline of Chapter VI by giving heed to geographical and other disturbing considerations.

First of all, it is well to realize that what has heretofore been called the first tool, the Chellean pick or coup-de-poing, was not so much the only tool of its period as the most characteristic one. It seems to have been accompanied at all times and everywhere by smaller, less regularly made implements, some of which were even worked out of flakes instead of cores and subjected to crude blow-retouching. Further, these medium-sized pieces were probably "invented" before the coup-de-poing; which is after all what might be expected, the coup-de-poing being a comparatively effective, regularly shaped, symmetrical implement involving both an ideal of form and a tolerable, rough skill to produce. Several Pre-Chellean stations, containing such smaller implements but no coups-de-poing, are now recognized by many specialists in prehistory. The most notable are those of St. Acheul and Abbeville, in northern France; the remainder are in the same part of that country, in Belgium, or in southern England, which at that time formed part of the continent. The fauna of some of these sites is an early one and has been attributed to the second interglacial era (§ 69) as compared with the third interglacial in which the Chellean and Acheulean fall.

When the Chellean proper, with its typical, well-developed picks, is examined, it becomes clear that the distribution of this distinctive form is limited to a narrow strip of westernmost Europe from Belgium to Spain. The picks recur in north and east Africa and the districts of Asia bordering on the Mediterranean. They may not be of exactly the same age in these regions as in westerly Europe, but they are of the same type, and in view of the continuity of their distribution must be historically connected. In fact, the coup-de-poing Chellean might well be described as essentially an African (or Africo-Asian) development which underwent an extension across what was then the land-bridge of Gibraltar up the Atlantic face of Europe (Fig. 37).

The remainder of Europe was evidently also inhabited in this era; but by people of a variant culture. From Germany eastward into Russia, possibly Siberia, implements were worked which in part suggest the Pre-Chellean ones of northern France, in part developments of such Pre-Chellean pieces, and in part forms approaching Mousterian types. They do not include Chellean picks. The name Pre-Mousterian has been proposed for this central and east European culture. This name is appropriate, provided it is remembered that Pre-Mousterian denotes not a phase intermediate between the Acheulean and Mousterian of western Europe, but a culture developed, like the Chellean, yet more or less independently, out of the Pre-Chellean, and approximately coeval with the pure Chellean of western Europe and its Acheulean continuation. In other words, two culture-areas, an African-west-European and an east

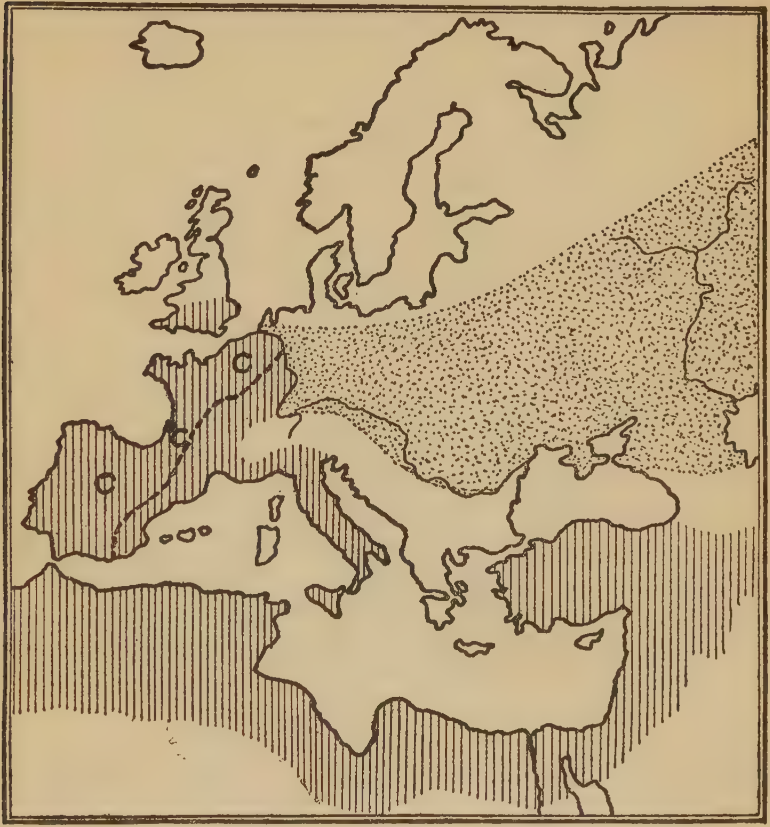

FIG. 37. Early Lower Palæolithic culture-areas (about 100,000-50,000 B.C.). Vertical shading, Chellean-Acheulean culture, with coups-de-poing. The principal European districts containing typical Chellean coups-de-poing are marked "C." Stippling, "Pre-Mousterian" culture, probably contemporaneous with Chellean and Acheulean, but lacking coups-de-poing. White, uninhabited or unexplored. (Mainly after Obermayer.)

European, begin to be discernible from an extremely early time in the Lower Palæolithic (Fig. 37).

During the Acheulean, the western culture spread somewhat: into southern England, southeastern France, Italy, and began to overlap with the eastern culture along the Rhine. In the Mousterian, an assimilation seems to have taken place: culture, or at least flint industry, became more uniform over the whole of Europe, and in a measure the near parts of Asia and Africa also. This general Mousterian culture, with its small implements and emphasis on retouching, seems more likely to have evolved out of the pickless eastern Pre-Mousterian than out of the western Chellean-Acheulean with its large hewn coups-de-poing.

This would suggest an eastern origin for Mousterian man—the Neandertal race. But it is well not to proceed beyond some slight probability on this point because it is by no means certain that culture traveled only as races traveled. In their simple way, culture contacts without migrations may have been substantially as effective in shaping or altering civilization fifty thousand years ago as to-day. For all that can be demonstrated at present, the Mousterian Neandertal men of western Europe may have been the blood descendants of the undiscovered Chellean-Acheulean inhabitants of western Europe who had learned more effective retouching and smaller tools from the east Europeans.

215. UPPER PALÆOLITHIC CULTURE GROWTHS AND RACES

With the advent of the Upper Palæolithic, possibly some 25,000 years ago, the divergent culture-areas of the early Lower Palæolithic which had become largely effaced during the Mousterian, emerge again; but with shifted boundaries. The line of demarcation now is no longer formed by the Rhine and the Alps, but by the Pyrenees. Throughout the Upper Palæolithic, most of Spain formed an annex to the North African province, whose culture has been named the Capsian after the type station of Gafsa in Algiers. The Aurignacian, Solutrean, and Magdalenian as they have been previously described (§ 72-81) ran their course in a middle European belt stretching from France to Poland (Figs. 38, 39). Northern Spain, southern England, at times Italy and southern Russia, were more or less in this mid-European province. The Balkans remain insufficiently explored; all northernmost Europe was still uninhabited. In general, it may be said that the mid-European Upper Palæolithic culture is characterized by the associated traits of work in bone and art; the contemporary Spanish-African Capsian

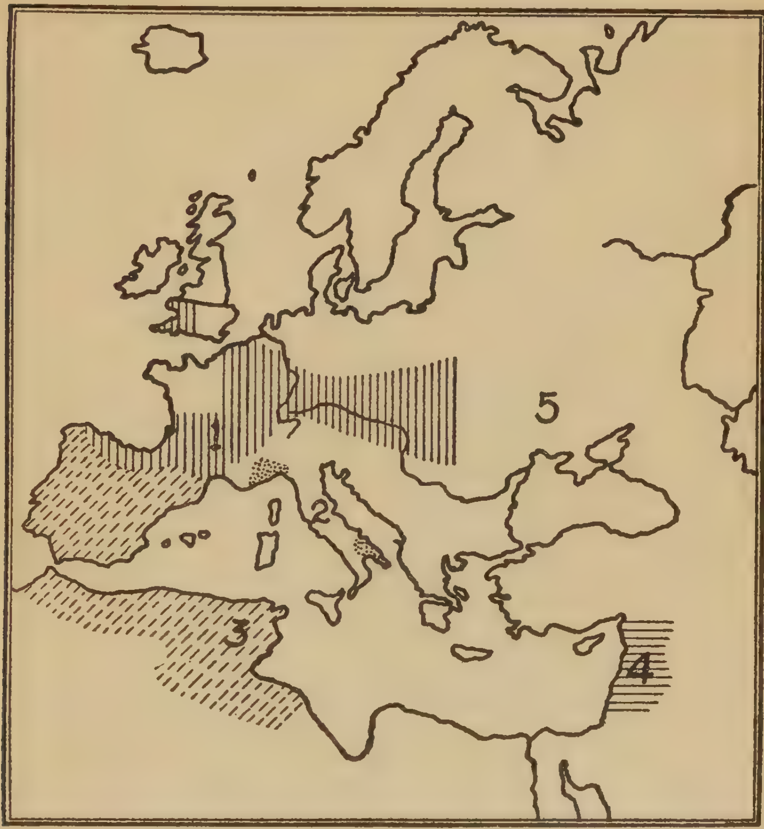

FIG. 38. Aurignacian culture-areas (about 25,000-18,000 B.C.). 1, West-central European Aurignacian, with art. 2, Italian Aurignacian. 3, Lower Capsian of North Africa and Spain. 4, Lower Capsian of Syria. 5, South Russia, perhaps post-Aurignacian. (Mainly after Obermayer.)

by specialization along the line of increasingly smaller and finer flint implements, culminating in neat microliths measurable only in fractions of inches.

The southern equivalent of the mid-European Aurignacian was the Lower Capsian, of at least equal territorial extent even in its narrowest form (Fig. 38). The industry of Syria at this period was allied to the Capsian of Africa and may be regarded as related to it. The rather scant remains of the age in Italy are perhaps also to be allied with the Capsian culture rather than with the true Aurignacian. This makes it look as if at this time a great Lower Capsian culture-area embraced nearly all the shores of the Mediterranean. As against this, the mid-European true Aurignacian, so far as now known, covered only a narrow region.

During the Solutrean and Magdalenian, Africa and Spain were in the Upper Capsian. Evidence from the eastern Mediterranean begins to fail. Italy is wholly without discovered remains. There are indications (§ 240) that at least by the beginning of the Magdalenian in Europe, the favored land of Egypt had already entered into the Neolithic. If this is so, westernmost Asia, Greece, and even Italy may have begun to be affected by this higher phase of culture, and the paucity or absence of their late Palæolithic remains would be accounted for. This view seems reasonable, but is unproved.

The Solutrean seems to have been a brief period in western Europe, and its extent appears limited also (Fig. 39). It reveals two principal areas: one north of the Danube, the other in southern France. The former may have been the earlier, from which the culture, or certain phases of it, such as the art of even surface retouch on leaf-shaped blades, were carried westward into France. In this connection two facts may be significant.

First is the circumstance that the north Danubian Solutrean area possessed an art, apparently largely of Solutrean age, which is quite different from the Upper Palæolithic art of the west. Naturalism was scarcely attempted, figures were highly conventional, the style was one of concentric curves or stippling or hatching.

The second consideration is the Brünn race. This type, which as yet is known only from a few examples (§ 17), is generally considered Neandertaloid, but also shows leanings toward the Cro-Magnon race as well as differences from it. The less dubious

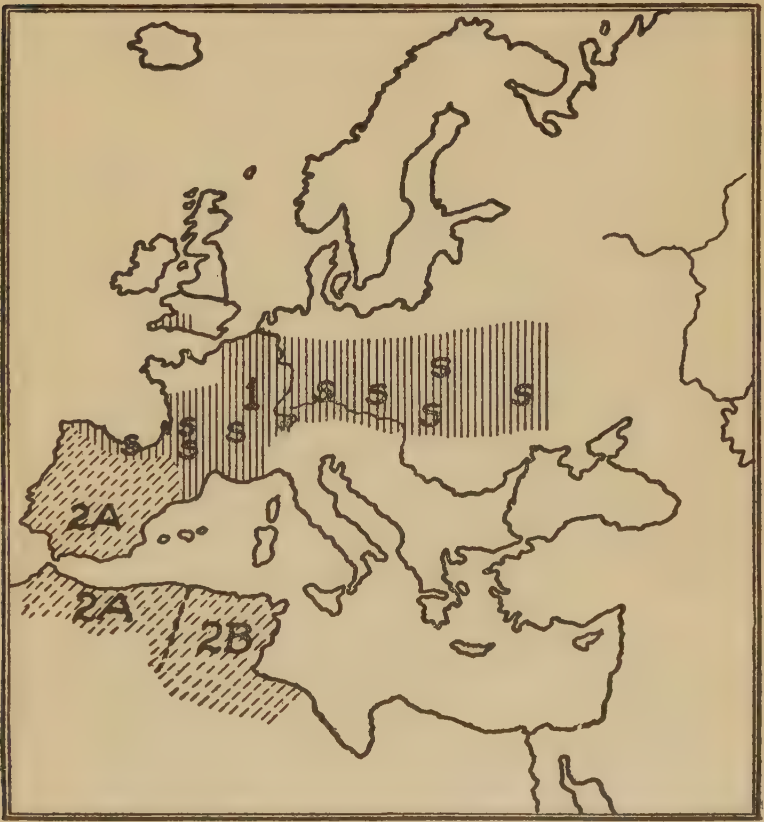

FIG. 39. Solutrean and Magdalenian culture-areas (about 18,000-10,000 B.C.) *S,* areas of pronounced Solutrean industry. 1 (vertical shading), Magdalenian culture. *2A, 2B,* Upper Capsian, western and eastern provinces, contemporaneous with Solutrean and Magdalenian. (Based on Obermayer.)

Brünn remains, those from Brünn, Brüx, and perhaps Predmost, are all from Czecho-Slovakia, that is, the north Danubian region; and they seem to be of Solutrean age. These facts render it likely that there existed a connection between the east

Solutrean culture, the geometric art, and the Brünn race, and they indicate at least some probability of the spread of Solutrean culture from eastern to western Europe. Brünn man may have been a modified Neandertal man who persisted in the east after Cro-Magnon man had become established in the west during the Aurignacian. Or he may have been a local eastern variant of a generic type whose better known western form we call Cro-Magnon man.

As to Grimaldi man, his Negroid affiliations also seem less startling once it is clear that the Aurignacian civilization was a mid-European phenomenon, and that contemporary Spain and probably Italy formed part of the essentially African development of the Lower Capsian. With southern Europe a cultural annex of north Africa at this period, the presence there of a Negroid type is reasonable enough. Further, both the strait of Gibraltar and that between Tunis and Sicily were land bridges during part of the Pleistocene; Gibraltar, for instance, probably during the Lower Capsian and, again, after a subsidence, in the Upper Capsian. The Mediterranean, in other words, must be conceived not as a great barring sea, but as a land-locked lake or pair of lakes, so that Europe and Africa were joined geographically as well as racially and culturally.

As to the Cro-Magnon race, its association with the Aurignacian-Magdalenian culture of mid-European type is clear enough, but its origin remains problematical. One naturally looks eastward: to the north lay ice, to the west the Atlantic, to the south a different even though related culture. But nothing is really known; no ancestral Asiatic form, no closely cognate later race, no eastern culture out of which the Aurignacian might have sprung nor to which it might have been specifically related. All or some of these may have existed, but in the absence of discovery, speculation is of little profit. There is the further difficulty about a theory that brings Cro-Magnon man out of the east into the west of Europe, that a little later, in the Solutrean, central Europe, through which he presumably passed, seems to have been in possession of the Brünn race. True, this might have been a later wave out of the east; but to derive both races out of Asia, and perhaps the preceding Neandertal type also, is a bit monotonous as a hypothesis, besides being one of those assumptions that seem to answer problems without really helping their understanding.

Much the same may be said as to the fate of Neandertal man —whether he was exterminated by the Cro-Magnons, or absorbed, or was driven away, or died out. A single discovery on this point will be worth more than the most elaborate conjecture.

Two points seem clear, whatever may have been the diffusions of race and culture at the time that the Lower Palæolithic was being replaced by the Upper. On the side of flint industry, there was no break: the Aurignacian is the continuation of the Mousterian. The experts occasionally have difficulty in agreeing whether a station or level is to be assigned to the late Mousterian or early Aurignacian. Whatever, therefore, was imported in the Upper Palæolithic was joined to something that remained over and continued in middle Europe from the Lower Palæolithic. Secondly, the center of known naturalistic art development was the west, southern France especially; perceptibly in the Aurignacian, notably in the Magdalenian. Yet this tract is peripheral to the Aurignacian-Magdalenian culture as a whole. It would thus be a forced explanation to look upon this art as the outright result of a diffusion or migration: the supposed recipients of the accomplishment would be carrying it farther than its originators. In other words, Upper Palæolithic art was in the main a growth on the soil of western Europe, so far as present evidence indicates. These findings diminish the probability of any large scale importation of Upper Palæolithic culture ready made as a by-product of the irruption of a new race. The change from Lower to Upper Palæolithic was indeed profoundly significant. But much of it may have been consummated by a gradual evolution within western and central Europe.

It is worth observing that the Lower Palæolithic of Europe with all its fundamental unity of culture stretched through different climates. The Chellean was at least in part subtropical, the Acheulean a time of cooling steppe climate, the Mousterian the period of maximum glaciation. The Upper Palæolithic again has its transition from the close of the Würm glaciation to the present temperature of Europe broken by three temporary advances of the ice, known as they occurred in the Alps as the Bühl, Gschnitz, and Daun phases. The following correlation of climatic and cultural periods has been suggested: Aurignacian, close of the last glacial and beginning of the post-glacial; Solutrean, first maximum of ice recession (*Achenschwankung*); Magdalenian, Bühl advance, second recession, and Gschnitz advance, corresponding respectively to the early, middle, and late stages of the period. To these might be added that the Azilian came at about the third recession and brief final Daun advance; the Neolithic, with the final recession of ice and appearance of modern conditions. It is clear that climatic circumstances were not the chief determining factor in the cultural development of early Europe. Had they been such, the Chellean would have differed culturally more from the Mousterian than this from the Aurignacian.

Southern Europe and North Africa were not glaciated in the Pleistocene. Heavier rainfall, perhaps accompanied by forestation, are likely to have taken the place of the ice, whereas a change from forest to steppe, or steppe to desert, corresponded to the recession of the ice in Alpine and northern Europe. For more distant regions, such as India and south Africa, the climatic correlations with Europe become dubious; which is one of the reasons why as yet no sure linking in time can be effected between their Palæolithic culture and that of Europe.

216. THE PALÆOLITHIC AFTERMATH: AZILIAN

After the Magdalenian, there follows in western Europe the Azilian, or Azylian, named after Mas d'Azil in the French Pyrenees. It has also been called Tourassian. This was the period in which the reindeer died out, being replaced by the deer. Harpoons were accordingly made of deer horn instead of reindeer antler, the spongier texture of the interior of the material necessitating a coarser and broader form. Perforations to hold the harpoon line now began to be regularly provided. Bone implements were fewer, chiefly awls or simple dart heads. Stone implements became less important. The best made flint forms were minute points or blades of geometric form, often trapezoidal. These are the microliths, obviously intended, in the main, for insertion in wood, sometimes perhaps in sawlike rows. The great naturalistic Magdalenian art was dead in the Azilian. Its place was taken by simple conventional designs painted on pebbles, sometimes curiously suggestive of alphabetic symbols, although it is unthinkable that they could at this early time, and among so backward a people as these deer hunters, have served any purpose of writing. The puzzling designs are more likely to have been used in magic or religion.

The period of the Azilian was perhaps 10,000-8000 B.C. The climate was approaching that of to-day, though still cooler. The area of the Azilian proper was limited to the Pyrenean environs of southern France and northern Spain. Related and contemporary cultures can however be traced much farther; and the name Azilian in a larger sense may justifiably be applied to these also. The greater part of Spain and Portugal and north Africa were at this time in the Terminal Capsian. This was a local phase lacking the deer horn harpoons and painted pebbles of the Pyrenees, but with the microlithic flint industry especially conspicuous. In fact it is in Africa that the development of the extreme microlithic forms out of their antecedents, the reduced implements of the Upper Capsian, has been most clearly traced. In Europe the Azilian forms do not connect nearly so closely with the preceding Magdalenian. It looks therefore as if the culture of western Europe in this period were based to a considerable extent on traits evolved in Africa, to which various additions were made locally, like the pebble-painting in the Pyrenean area. This preponderance of African influences is corroborated by the occurrence in Syria and southern Italy of small flints allied to the Terminal Capsian ones. The same may be said of a culture phase of northern France, the Tardenoisian, which extended also to Belgium and England—which latter seems not to have become finally separated from the continent until about this era. The Tardenoisian is specifically characterized by microliths almost indistinguishable from the north African ones, but lacks the other traits of the south French Azilian. It may also have persisted longer, into the period which in the south was already early Neolithic. Approximately contemporary and related is also the south German culture represented at Ofnet, famous for its nests of skulls from decapitated bodies; and that in southern Scandinavia called Maglemose (§ 233). In Scotland and northern England, on the other hand, the harpoon head is once more to the fore, perhaps because here as in the Pyrenean area forested mountains and the sea were in juxtaposition and deer and salmon could both be taken abundantly. The food habits of sub-arid and arid north Africa must have been quite different; in fact it is evident that snails were seasonally consumed here in large quantities.

All these local phases interrelate and may be grouped together as Azilian as designative of the period and generic culture. The map (Fig. 40) shows the extent to which the manifestations of this culture stage have been traced. They may prove to extend farther.

Spain, at the close of the Palæolithic, possessed art of three types. In the north, Magdalenian realism flourished as vigorously as in neighboring southern France. The paintings of the cave of Altamira, for instance, are no less numerous and superb than those of Font-de-Gaume. Second, in the south, there prevailed a conventional style. Men and animals are still recognizable, but schematically drawn, and among them are pictographic symbols. Third, in eastern Spain, a cliff art was realistic in purpose, but crude in execution. One can see without difficulty what the figures are doing, but the proportions are distorted, and the fresh, vivid, sure spirit of Magdalenian painting is wholly lacking. The figures represent people more often than animals: gatherings, dances, long-gowned women, men with bows. This is the earliest direct or indirect record of the bow and arrow. It dates from the final phase of the Palæolithic, and the weapon may not have become employed throughout Europe until the Neolithic was definitely under way.

It is well to remember in this connection that no specific type of culture, no matter how old, is likely ever to have existed without variation over a whole hemisphere or continent. The later any type is, the greater is the probability that it has had sufficient time for specific characterization to enable it to be distinguished readily from the contemporary cultures of other areas. The local provinces or culture-areas of the Palæolithic foreshadow the deeper regional differentiations of the Neolithic, Bronze, and Iron Ages.

There is some variation of usage as to whether the Azilian is assignable to the Palæolithic or Neolithic. Some include it with the earliest Neolithic phases to constitute a Mesolithic or Middle Stone Age. The era has also been designated Epi-Palæolithic and Proto-Neolithic. The concept of a separate Mesolithic period becomes important in the degree that the original definition of the Neolithic as limited to the age of polished stone remains rigorously adhered to. With the Neolithic conceived more broadly, as discussed in the following sec-

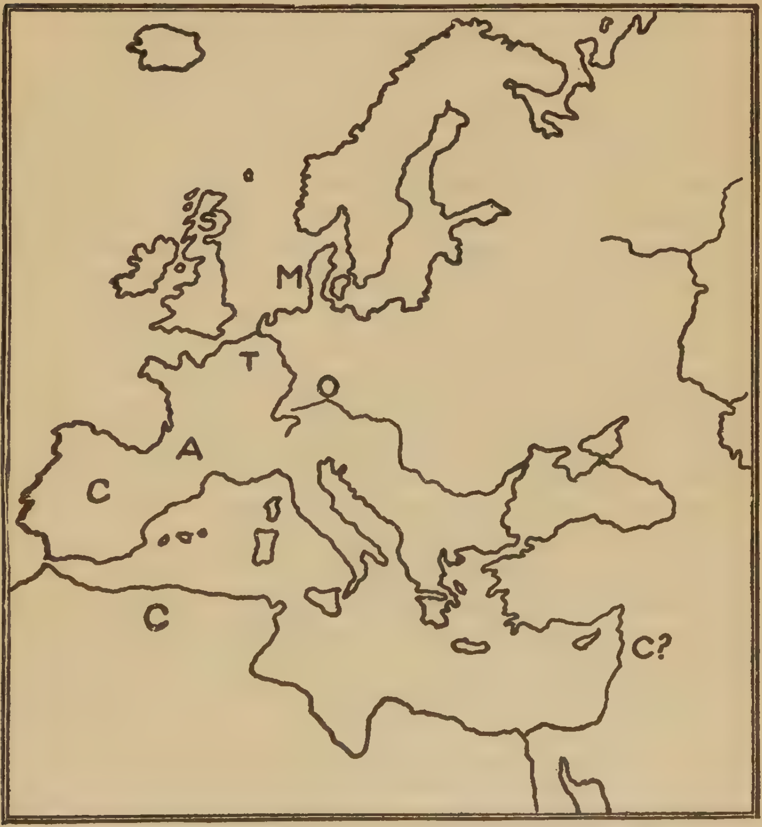

Fig. 40. Phases of the close of the Palæolithic (about 10,000-8,000 B.C.). *A*, Azilian proper; *C*, Terminal Capsian; *M*, Maglemose; *O*, Ofnet, Bavaria; *S*, Scotch and north English Azilian; *T*, Tardenoisian.

tion, a separate Mesolithic becomes unnecessary, and the Azilian takes its place as a final Palæolithic episode of mixed African and local developments after the passing of the characteristic European Upper Palæolithic.

217. THE NEOLITHIC: ITS EARLY PHASE

The Neolithic is by original definition the age of polished stone as opposed to the fracturing of stone in the Palæolithic. In a sense, this definition is a true one, at any rate for Europe and the Near East. There is no stone grinding in the Palæolithic and there is in the Neolithic. But since the two stone ages were first discriminated fifty or more years ago, a vast body of knowledge has accumulated about them, with the result that the original criterion has become only an approximate one. The definition of the Neolithic as the age of ground stone is at the present time so over-elementary as to have become inaccurate. A long initial phase of this age did not yet grind stone, but continued to use tools made by the Palæolithic process of chipping. It was not until the latter part of the New Stone Age was reached, what we may call the Full Neolithic, that the grinding and polishing of stone were attempted.

What, then, it is natural to ask, makes the Early Neolithic Age really Neolithic—what in fact separates it from the Palæolithic? It is a cluster of traits; a cluster that grew as the Neolithic progressed; but every one of whose constituents was lacking from the Old Stone Age.

218. POTTERY AND THE BOW

Outstanding in this cluster of cultural traits that mark the Neolithic is pottery. Wherever, in Europe and the Near East at least, there is universal agreement that a stage of development was Neolithic, pottery is present. And conversely, wherever pottery occurs, no one has yet doubted that a true Neolithic stage existed. The earliest potteryless phases, such as that of Maglemose, which have sometimes been designated as Proto-Neolithic, sometimes as Mesolithic, can advantageously be considered terminal Palæolithic.

Second in importance is the bow, which in general appeared contemporaneously with pottery The evidence for its existence is sometimes less clear. Pottery is imperishable and unmistakable. The bow and arrow, on the other hand, are made of materials that decay in a few years, under ordinary conditions. Only the stone or bone point preserves, and this cannot always be distinguished with positiveness from the head of a light spear or even from a small knife blade. There was a time, for instance, when the smaller flint blades of the Solutrean were often regarded as arrow points, whereas now the tendency, based on more intensive comparisons, is to deny the bow and arrow to the Magdalenian as well as the Solutrean. Certainly the harpoon and its thrower are so numerous and indubitable in the Magdalenian that there would be reason to expect an important weapon like the bow to have left at least some sure traces: a definitive type of recognizable arrow head would have been worked out. But such is not the case.

These two culture elements, pottery and the bow, signalized an enormous advance over the past. Both required definite technical skill to manufacture. And both were of the greatest service. Whole lines of foods could now be utilized that had formerly been passed by: soups, stews, porridges. Plants whose seeds or parts before were inedible, or almost so, were added to the diet as soon as they could be boiled. The bow made possible long range fighting, the free pursuit of large game, and the capture of many small mammals and birds which previously it must have been difficult to take. The harpoon was developed chiefly for fishing. It would be of little help in killing birds, rabbits, and the like, or large and dangerous animals like wild cattle.

219. Bone Tools

Hand in hand with the invention or rather introduction of the bow and pottery—it seems doubtful whether they were devised in Europe—went an increased employment of bone and horn tools at the expense of stone. This drift had already begun in the Upper Palæolithic; in fact, is one of the signs that mark it off from the Lower Palæolithic. It became accentuated as the Upper Palæolithic wore on, still more prominent in its closing Azilian phase[1]—hence the increasing minuteness of flint blades—and continued into the early Neolithic. A good working chisel, wedge, awl, or needle, for instance, must be smooth. This finish is difficult in chipped stone, but easily attained in bone or horn by rubbing. It was not therefore until stone grinding came into use in the later Neolithic, that bone and horn began to fall in significance as materials. But they had performed their service. It is unlikely that stone polishing would have been attempted but for the experience and long habits of the polishing process as acquired in dealing with the softer materials.

220. The Dog

The first animal was also domesticated about the beginning of the Neolithic. Dog remains have been found in two very late post-Magdalenian Palæolithic sites, one in Scotland, the other in Denmark, both apparently Azilian in age. Then, the Danish kitchenmiddens, which began in the first stage of the Early Neolithic, contain innumerable bones that have been gnawed by dogs. The animals may still have been half wild at this period, since their own skeletons are rare in the middens. Evidently the species was not yet firmly attached to man; its members went off to die in solitude. This is what has generally been predicated on hypothetical grounds of the history of dog and man. Contrary to most domesticated animals, the dog is thought not to have been captured and tamed outright, but to have attached himself to human beings as a parasitic hanger-on, a shy, tolerated, uncared-for scavenger, living in a stage of symbiotic relationship with our ancestors before his real domestication. This view the prehistoric evidence seems to confirm.

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[1] These are the proportions of implements of flint to those of bone or horn in several stations of different age:

Hundsteig, Austria, early Aurignacian	20,000	2
Sirgenstein, Würtemberg, Aurignacian	1,000	rare
Sirgenstein, Würtemberg, early Solutrean	700	10
Predmost, Czecho-Slovakia, Solutrean	25,000	many
Schweizersbild, Switzerland, late Magdalenian	14,000	1,300
Maglemose, Denmark, Azilian	881	294
Oban, Scotland, Azilian	20	150

221. The Hewn Ax

One more trait signalizes the Early Neolithic: the hewn stone ax. This was a chipped implement, straight or slightly convex along the cutting edge, tapering from that to the butt, about twice as long as broad, rather thick, unperforated and ungrooved; in fact perhaps often unhandled and driven by blows upon the butt: a sharp stone wedge as much as an ax, in short. The whole Palæolithic shows no such implement: even the Azilian has only bone or horn "axes."

It is hardly necessary to repeat for the Neolithic what has already been said of the Palæolithic periods: the older types, such as chipped flint tools, continued very generally to be made. Such persistence is natural: a survival of a low type among higher ones does not mean much. It is the appearance of new and superior inventions that counts.

The Early Neolithic can be summed up, then, in these five traits: pottery; the bow and arrow; abundant use of bone and horn; the dog; and the hewn ax.

222. The Full Neolithic

It is the later or Full Neolithic, beginning probably between 6000 and 5000 B.C. in western Europe, that is marked by the grinding or polishing of stone. Even this criterion is less deep-going than might be thought from all the references that prehistorians have made to it, since the new process was put to limited service. Practically the only stone implements that were ground into shape in Europe were of the ax class: the ax head itself, the celt or chisel, hammer stones, and clubheads. The mill is the principal artifact that can be added to the list. The ax long remained what we to-day should scarcely dignify with the name of ax head: an unpierced, ungrooved blade. It is only toward the end of the Neolithic in Europe, after metal was already in use in the Orient and Mediterranean countries, that perforated and well ground stone axes appear; many of these make the impression of being stone imitations, among a remote, backward people, of forms cast in bronze by the richer and more advanced nations of the South and East.

Much more important than the ground stone ax in its influence on life was the commencement, during the Neolithic, of two of the great fundamentals of our own modern civilization: agriculture and domestic animals. These freed men from the buffetings of nature; made possible permanent habitation, the accumulation of food and wealth, and a heavier growth of population. Also, agriculture and animal breeding were evidently introduced only after numbers had reached a certain density. A sparse population, being able to subsist on wild products, tends to remain content with them. A fertile area with mild winters may support as high as one soul per square mile without improvement of the natural resources; in large forests, steppes, cold climates, and arid tracts, the territory needed for the subsistence of each head becomes larger in a hunting stage of existence.

The cultivated food plants of the European Neolithic were barley, wheat, and millet, pease, lentils, and somewhat later, beans and apples. All of these seem to derive from Mediterranean or west Asiatic sources. Of non-edible plants there was flax, which served textile purposes and involved loom weaving.

The species of domesticated animals numbered four, besides the dog: cattle, swine, sheep, and goats. The horse,[1] cat, hen, duck, came into Europe during the metal ages, in part during the historic period.

223. Origin of Domesticated Animals and Plants

The place of first domestication of the four oldest species is not known surely. Most of them had wild representatives in Europe long before and after the domesticated forms appear, but the same was true in western Asia and Egypt, and the general priority of these tracts in metal working and other cultural achievements makes it likely that their inhabitants were also the first to tame the animals in question. The subject is as intricate as it is interesting, because of difficulty which biologists experience in tracing the modified tame forms back to the wild species with certainty. The mere fact of continued domestication, even without conscious selection in breeding, often alters a species more from what may have been its old wild form than this differs from another wild species.

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[1] The horse seems to have survived wild in parts of Europe until the Neolithic, but the first domesticated forms, in the Bronze Age, appear to have been brought in from Asia.

It is however clear from the unusually abundant and well preserved Lake-dwelling remains of Switzerland that the earliest known domestic animals of this region were considerably different from the nearest native species. The wild bull or urus of Europe, *Bos primigenius,* was large and long-horned. His bones in the oldest lake dwellings seem to come from wild individuals that had been hunted. Alongside are the remains of the domesticated *Bos brachyceros,* a short-horned form, small and delicately built. Later, though still in the Neolithic, long-horned tame cattle appear in the lake dwellings. Apparently the shorthorns had first been imported from the south; then the native urus was tamed; finally, the two strains were crossed. These strains are thought to survive in our modern cattle, those of eastern and central Europe being prevailingly of the *primigenius,* of western Europe of the *brachyceros* type.

A similar story applies to the pig. The first domesticated swine of Switzerland were small, long-legged, and easily distinguishable from the wild boar of the region. It thus is likely that they were imported domesticated. In the Bronze Age, pigs grew larger, due perhaps to crossing with the wild species. Sheep were certainly brought into Europe, as there is no corresponding wild form; the goats, too, have their nearest relatives in Asia. They were perhaps tamed before sheep. At any rate, goats prevailed in the earlier lake dwellings, whereas later, sheep outnumbered them.

Similar arguments apply to the origin of the cultivated plants in Europe. For some of these, such as wheat, wild relatives—possible ancestors—are known from Asia, but not from Europe. Also there has been such a drift of later cultivated plants—legumes, greens, and fruits—from Asia and the Mediterranean into Europe during the Bronze and Iron Ages, as to render it probable that the earliest flow was in the same direction. The instances of diffusion from north to south are few: oats, rye, and hemp are perhaps the principal. These plants, however, were carried southward slowly and accepted reluctantly, whereas the northerners were in general avid of any southern or Oriental form which would bear their climate, as the progressive spread and increased use of new forms shows. Furthermore, even oats, rye, and hemp appear to be Asiatic in origin, and thus to have entered Europe merely from the east, instead of southeast.

224. Other Traits of the Full Neolithic

The earliest animals were kept for their flesh and hides. Two or three thousand years passed before cattle were used before the plow or to draw wagons. Both the plow and the wheel were unknown in Europe until well in the Bronze Age, after they had been established for some time in Asia. Still later was the use of milk. Here again Asia and Egypt have precedence.

Many other elements of culture appear in the Full Neolithic. Houses were dug into the ground and roofed over with timbers and earth. The dead were buried in enduring chambers of stone: ''dolmens,'' often put together out of enormous slabs; or excavations in soft bed rock. Upright pillars of undressed stone were erected—either singly as ''menhirs'' or in ''alignments''—in connection with religious or funerary worship. Pottery was ornamented in a variety of geometric decorative styles, usually incised rather than painted; their sequences and contemporary distributions in several areas are gradually being determined.

225. The Bronze Age: Copper and Bronze Phases

There is no abrupt break between the Neolithic and the Bronze Age. Metal was at first too rare, too difficult to mine and smelt and work, to be used extensively. It served for special weapons, tools, and ornaments of the wealthy. The life of the mass of the population went on in much the old channels for generations or centuries after the new material had become known. This was true especially of peoples in oreless regions, or too backward to have learned the art of metal working. To such nations, the first bronze came as an imported rarity, to be guarded as a treasure or heirloom.

Of even less immediate effect than the discovery of bronze, was that of the first metals known, copper and gold. The latter is of course too scarce and too soft to serve for anything but ornaments; and pure copper also, even when hardened by hammering, is of little use for many mechanical purposes. It makes a fairly efficient dagger, a rather mediocre ax, and a poor knife. The result was that a recognizable period of copper preceded the true Bronze Age, yet that it was essentially a last phase of the New Stone Age, with the metal creeping in as something subsidiary. In Italy and Spain it has therefore become customary among archæologists to speak of an ''Eneolithic'' period as a transition stage in which some copper, and occasionally bronze of low tin content, occur. In central and northern Europe, the equivalent stage falls somewhat later and is sometimes called the Stone-Bronze period.

Bronze is an alloy of tin with copper, harder than the latter, easier to melt, and casting better. In many properties it resembles brass, by which term it is referred to in the English Bible; but must not be confounded with it. Brass is an alloy of zinc with copper, of much later discovery, apparently in Asia, and until recent centuries little used in Europe. As regards bronze, even a two per cent addition of tin to copper results in a perceptible hardening; and five to ten per cent produce a greatly superior tool metal.

The origin of bronze is a problem of some difficulty, because the earliest known users of bronze, the peoples of the Near East, possessed little or no tin. There are said to have been tin supplies in the Khorasan district of Persia, which might have been drawn upon by the pre-Babylonians and thence carried to Egypt. The chief source of the tin of later antiquity was Spain and England. But at the outset of the Bronze Age, the Orientals did not even know of the existence of these countries, while their natives, still ignorant of copper, could not have mined tin for the purpose of hardening that basic metal.

Just how, then, bronze was discovered, is still unknown; but it must have been in Western Asia not later than the fourth millenium B.C. Before 3000 B.C., in the period of the first dynasties ruling over united Egypt, the art had been established in that country, since bronzes low in percentage of tin have been discovered from that era. While ancient Egypt mined its own copper in the adjacent Sinai peninsula, it is barren of tin resources, so that the latter metal must have been imported. Within a few centuries, bronze began to be used in Crete and Troy, and by 2500 B.C. in Italy and Spain, whereas it did not penetrate central and northern Europe until about 1900 B.C., according to the usual estimates. That the use of bronze over these widespread areas is a connected phenomenon, a case of single origin and diffusion, is clear from the manner in which the art spread from its center of invention like a wave which arrived later the farther it had to travel. The spread is confirmed by the fact that certain implement forms such as early triangular daggers and later swords traveled with the material. Had the western natives discovered bronze for themselves, they would have cast it into shapes peculiar to themselves, instead of adopting those long established among the Orientals.

226. Traits Associated with Bronze

About coincident with bronze there developed in Egypt and Babylonia a flood of new arts and inventions: writing; sunburned brick; stone masonry; sculpture and architecture; the arch; the plow and later the chariot; the potter's wheel, which turns clay vessels with mechanical roundness; astronomical records and accurate calendars; an enhanced cult of the dead and greater monuments for them. Many of these elements were carried into westernmost Asia and the Ægean Islands; not so many to Italy; fewer still to Spain and France; and a minimum to central and northern Europe. But it would be an error to infer from the continued backwardness of the northern peoples that they were wholly passive and recipient. In their simpler, more barbaric way, they remodeled much of what they had carried to them, altered the form, decorated it in their own style, made much of some item which filled but an insignificant place in the more complex civilization of the southeast. The fibula or safety-pin, for instance, was seized upon with avidity by the central and north European nations, made ornate and tremendously enlarged, until it sometimes measured half a foot in length and more than half a pound in weight with spiral whorls, bosses, pin clasps, or attached rings as big as a palm. The Baltic nations, the farthest reached by this diffusion, in particular threw themselves into the development of the fibula with zest, success, and a large measure of decorative taste.

Even longer is the history of the sword. This has two lines of historic development. The one-edged sword or saber tends to curvature and is essentially a hewing weapon, not intended for thrusting, or only secondarily so adapted. This form is first known in western Asia, is apparently of Asiatic origin, and is the direct ancestor of the Saracen and Indian scimitar, the Malayan kris and barong, the Japanese samurai's sword. The two-edged sword with point has at all times—until after the introduction of firearms—been the prevailing form in Europe. Its ancestor is the Egyptian bronze dagger, which in turn is probably derived from a copper and ultimately a flint blade of dagger length. The Egyptian dagger never grew to more than half-sword length, but the type was early carried to Crete and Italy and Spain. By 2500-2000 B.C. the latter countries were using triangular wide-bladed daggers of copper and bronze, with a basal breadth not much less than the length. The handle was a separate piece, riveted on. Gradually the length grew greater, the breadth less, the edges more nearly parallel, the point sharper; the half-sword and then the sword evolved out of the dagger. The handle, or its spike, came to be cast with the blade. These drawn-out forms traveling to central and northern Europe, were made there of greater and greater length, especially after iron was known. For three thousand years, and from the southern Mediterranean in its progress to the North Sea, the sword grew longer and longer, but always by gradual modification: the whole series of forms shows a transition in both time and geography. The Greek and Roman sword remained of thigh length, and was used mainly for thrusting; the Keltic and Germanic weapon was for hewing and almost unwieldy; blades so big as to require two-handed swinging finally came to be employed—a barbaric, ineffective exaggeration to which the long-cultured Mediterraneans never descended.

227. Iron

Iron was worked by man about two thousand years later than bronze. It is a far more abundant metal than copper, and

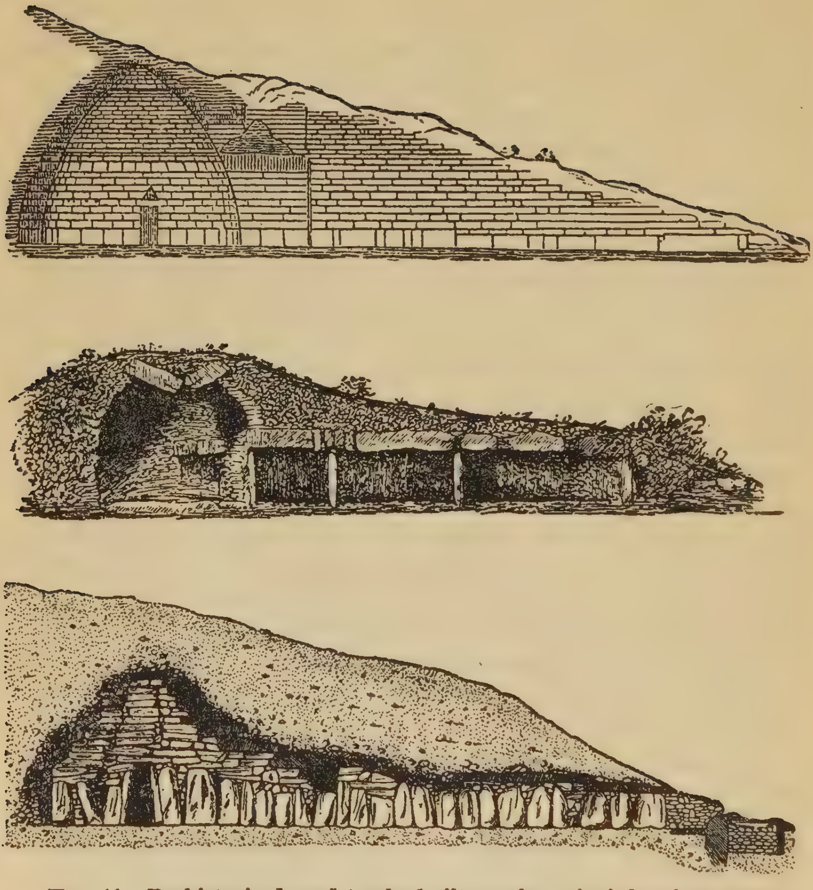

FIG. 41. Prehistoric domed tombs built on the principle of corbelling (§ 116): a probable example of the spread of a culture device over a continent. Above, Mycenæ, Greece; middle, Alcalar, Portugal; below, New Grange, Ireland. The Mycenæan structure, 1500 B.C. or after, at the verge of the Iron Age, is probably later by some 1,000 years than the others, which are late Neolithic with copper first appearing; and its workmanship is far superior. (After Sophus Müller and Déchelette.)

though it melts at a higher temperature, is not naturally harder to extract from some of its ores. The reason for its lateness of use is not wholly explained. It is likely that the first use of metals was of those, like gold and copper, that are found in the pure metallic state and, being rather soft, could be treated by hammering without heat—by processes more or less familiar to stone age culture. It is known that fair amounts of copper were worked in this way by many tribes of North American Indians, who got their supplies from the Lake Superior deposits and the Copper River placers in Alaska. If the same thing happened in the most progressive parts of the Eastern Hemisphere some 6,000 years ago, acquaintance with the metal may before long have been succeeded by the invention of the arts of casting and extracting it from its ores. When, not many centuries later, the hardening powers of an admixture of tin were discovered and bronze with its far greater serviceability for tools became known, a powerful impetus was surely given to the new metallurgy, which was restricted only by the limitations of the supply of metal, especially tin. Progress went on in the direction first taken; the alloy became better balanced, molds and casting processes superior, the forms attempted more adventurous or efficient. For many centuries iron ores were disregarded; the bronze habit intensified. Finally, accident may have brought the discovery of iron; or shortage of bronze led to experimenting with other ores; and a new age dawned.

Whatever the forces at work, the actual events were clearly those outlined. And it is interesting that the New World furnishes an exact parallel with its three areas and stages of native copper, smelted copper and gold, and bronze (§ 108, 196), and with only the final period of iron unattained at the time of discovery.

228. First Use and Spread of Iron

Some of the earliest known cases of the use of iron were decorative: for jewelry, or as inlay upon bronze. Finds of this sort have been made in Switzerland, Germany, Greece, and the Caucasus. Once however the extraction of the new material had become known, its abundance was so great as to further its employment, which grew fairly rapidly, though held back by several factors. One of these retarding causes was the prevalence of the casting process, which had become definitely established for bronze and was carried on with great skill, whereas iron lends itself to ready casting only in a foundry and for objects of larger size than were in customary use among the ancients. They forged their iron, and this new art had to be gradually learned. At its best, it could not produce some of the finer results of casting; in ornaments and statuettes, for instance.

Wrought iron is comparatively soft. A bronze knife will cut or shave better than a forged iron one. It was not until it was discovered that the iron from certain ores could be converted into steel by tempering—plunging the heated implement into water—that the new metal became a tool material superior to bronze. The invention of tempering seems to have followed fairly soon after the discovery of iron. But some centuries elapsed before this art became at all general.

Finally, conservative fashion operated to delay the undisputed supremacy of iron. Bronze has an attractive goldenish color; it oxidizes slowly and superficially; it was anchored in ritual; and it tended to remain associated with state and splendor, with wealth and nobility, whereas iron crept into commonplace and humble usages. Nearly four centuries after iron became known in the Greek world, the Iliad mentions it but twenty-three times, bronze two hundred and seventy times. In the Odyssey, a more bourgeois epic, and a little later in authorship, the proportion of references to iron is higher: twenty-nine to eighty. The first four books of the Old Testament, the composition of whose older parts is usually placed synchronous with that of the Iliad—about 850 B.C.—but whose outlook is the conservative one of religion, mention iron still more rarely: four times as against eighty-three references to bronze—''brass'' the Authorized Version calls it.

Which nation first made iron available to the world has not yet been ascertained. It was almost certainly some people in western Asia. The Hittites of Asia Minor, the Chalybes of Armenia, are prominent contenders for the honor. It could scarcely have been the most civilized people of the region, the Babylonians, because their alluvial country contains neither ore nor stone. The time was probably subsequent to 1500 B.C., but not long after. By the time of Rameses the Great, in the thirteenth century, the metal was known and somewhat used in Egypt, being imported from the Hittites. Contemporaneously, the early Greek invaders who overthrew the Ægean culture of Crete and Mycenæ and Troy were in the beginnings of the Iron Age. Italy learned the new material from the Etruscans about 1100 B.C. Babylonian and Assyrian records seem to refer to it some few centuries earlier. The Jews in the time of Saul, 1000 B.C., are said by the Bible to have had little iron and no steel, a fact that made possible their oppression by the Philistines of the coast. This people, apparently descendants of the Minoan Cretans, have recently been alleged as the discoverers of the art of steel making; though whether with reason, remains to be proved. In central Europe iron became fairly abundant about 900 B.C., and was soon mined and smelted locally. In northern Europe its first sporadic appearance is soon after, but its general prevalence, justifying the use of the term Iron Age, not anterior to 500 B.C.

In the Far East, the history of iron is little known. In India, where it is likely to have been derived from western Asia or Persia, its first mention is at the end of the Vedic period, whose close is variously estimated at 1400 B.C. and 1000 B.C. The metal must have been new then: it was called "dark blue bronze." The Hindus later carried knowledge of iron and steel-working to the Malaysian East Indies.

When China got its first iron is not known, though it appears to have been comparatively late. By the early part of the seventh century before Christ, iron had become common enough to be taxed. But it was used for hoes, plowshares, hatchets, needles, and domestic purposes only. Not until the fifth century B.C. did steel-making become introduced into China, and bronze begin to be superseded for weapons. Even in the first century after Christ the natives of southernmost China were fighting with bronze weapons in their struggle against amalgamation with the empire. At any rate, the Chou dynasty, the period of the production of the literary classics, from the eleventh to the third century B.C., was still prevailingly a time of bronze, as attested both by native historical records and the evidences of archæology. This lateness of iron in the Far East raises a strong probabiltiy that the Chinese did not enter the iron stage through their own discovery but were led into it by the example of Mongol or Turkish peoples of north central Asia, who in turn leaned upon the western Asiatics.

Japan has a definite Iron Age, well known through excavations. It is thought to have begun about the fourth century B.C. This approximate contemporaneity with China, whereas in nearly all the remainder of its culture Japan borrowed from China and followed long behind it in time, suggests that the Japanese or neighboring Koreans may have learned of iron directly from the north Asiatic teachers of the Chinese.

229. The Hallstadt and LaTène Periods

North of the Mediterranean lands, the prehistoric Iron Age of Europe is divided into two periods: that of Hallstadt, named after a site in Austria, and lasting from about 900 to 500 B.C.; and that of LaTène, designated from a famous discovery in Switzerland, which stretched from 500 B.C. until almost the birth of Christ. The Hallstadt period is better developed in middle than in western Europe: it was influenced from Greece, the Balkans, and Italy. It prevailed along the Adriatic and Danube as far as Bosnia and Hungary; over all but northern Germany; in Switzerland; and in eastern France. Its flow was northwestward. The LaTène culture was carried primarily by Kelts, falls into the period of their greatest extension and prosperity, and centers in France. Here it seems to have developed under the stimulus of Greek colonization at Marseilles, to have spread northward to the British Isles, and eastward into central Europe. Its general flow was northeastward.

Considerable iron and bronze work of some technical fineness was made during the Hallstadt and LaTène periods. Fibulas, jewelry, weapons, and cult apparatus were often elaborate. But the quality of the cultures remained homespun, backward, and barbaric as compared with the plasticity and polish which contemporary Greek civilization had attained.

The Hallstadt culture, for instance, was wholly without cities, stone architecture or bridges, paved roads, coins, writing of any sort, the potter's wheel, or rotary millstone; nor was metal used for agricultural implements. It was a time of villages, small towns, and scattered homes; of sacred groves instead of temples; of boggy roads, of ox-carts and solid wooden wheels; of a heavy, barbaric, warlike population, half like European peasants, half like pioneers; self-content, yet always dimly conscious that in the southern distance there lay lands of wealth, refinement, and achievement.

The LaTène time showed many advances; but, relatively to the civilizations of Greece and Rome—it was the period of Phidias and Plato, of Archimedes and Cicero—the northern culture was as many milestones of progress behind as during the Hallstadt era. The coins in use were Greek, or local imitations of Greek money, their figures and legends often corrupted to complete meaninglessness. Writing was still absent. Some attempts at script began to be made toward the close of LaTène, but they resulted in nothing more than the awkward Ogham and Runic systems. Until perhaps a century or two before Cæsar, there were no cities or fortified towns in Gaul. When they arose, it was on heights, behind walls of mixed logs, earth, and stone, as against the masonry circumvallations which the Ægean peoples were erecting more than a thousand years before. Even these poor towns were built only by Kelts; the Germanic tribes remained shy of them for centuries longer. Society was still essentially proto-feudal and rustic. But there had filtered in from the Mediterranean, and were being wrought locally, holed axes, iron wagon wheels, the potter's wheel and potter's oven, rotary mills, dice, tongs, scissors, saws, and scythes—all new to these northern lands, and curiously modern in their fundamental types as compared with the essentially half-primitive, half-barbarian suggestion that Hallstadt manufactures carry.

230. SUMMARY OF DEVELOPMENT: REGIONAL DIFFERENTIATION

Two conclusions emerge from the facts reviewed in this chapter and serve to prevent an over-simple and schematic conception of the growth of prehistoric civilization. The first is that successive phases of culture, even in the earliest times, cannot be identified, much less really understood, by reference to any single criterion such as this or that technique of working stone or the knowledge of this or that metal. In every case the culture is complex and characterized by a variety of traits whose combination produces its distinctive cast. The more important of these culture traits, with particular reference to Europe, may be summarized thus:

Period	*Culture Elements Appearing*
Iron	Iron, steel; in the Orient, alphabet
Bronze	Metals, alloying, megaliths; in the Orient, masonry, writing
Full Neolithic	Domesticated animals and plants, stone polishing
Early Neolithic	Pottery, bow
Upper Palæolithic	Bone work, harpoon, art
Lower Palæolithic	Fire, flint work

The second conclusion is that differentiation of culture according to region is too great to be lightly brushed aside. Even for the Palæolithic, which is so imperfectly known outside of Europe, and whose content is so simple, it is clear that the developmental sequences in Europe cannot be correctly interpreted without reference to provincial growths and their affiliations in other continents (§ 214-216). In the Neolithic, Bronze, and Iron Ages, regional diversity increases. Egypt and China, India and France, present deeply differentiated pictures in 3000 B.C., and again in 1000. Their cultures have throughout a separate aspect. And yet innumerable connections link them. The very bronze and iron that name the later ages, the grains and animals that are the basis of their economic life, were intercontinentally disseminated, and represent in most of the lands that came to possess them an import from an alien focus of growth. And currents usually run both ways. China received metals, wheat, cattle and horses, cotton, architecture, religion, possibly the suggestion of script, from the west; but she gave to it silk and porcelain, gunpowder and paper. Also there are inertias and absences to be reckoned with. The Near East probably gave to Europe most of the elements of civilization which the latter possessed during the Neolithic, Bronze, and Iron periods; but much which the Near East had, it failed to transmit. Writing flowed into Europe a full two thousand years after bronze, with which it was coeval in origin. Coinage is far later in the Orient than masonry, but outstripped it and became earlier established in western Europe.

The result is a great tangled web, whose structure is only gradually being revealed by painstaking comparison and intensive study. Often the most convincing evidence as to the composition and direction of the culture currents is provided by highly specialized matters: styles of pottery decoration, shapes of ax heads, forms of ornamental safety-pins. It is not because these minutiæ are so fascinating in themselves that archæologists are endlessly and often tediously concerned with them. It is because these data offer the longest clues through the labyrinth, because on their sure sequences can be strung hundreds of otherwise non-significant or detached facts. But the results are as yet incomplete; they are and promise to remain forever complex; and their systematic presentation in coherent narrative awaits a larger and future treatment. It will be wisest, in a work of the present compass, to outline the whole development of a single area, to serve as a type sample.

231. The Scandinavian Area as an Example

The most satisfactory region for such a purpose is Scandinavia—the peninsula, Denmark, and the Baltic coasts, including much of northeast Germany. This was a glacier-covered area in the Mousterian, and either obliterated or uninhabited in the Upper Palæolithic. It has therefore no Old Stone Age history. During the Magdalenian, the glaciers had shrunk to cover only most of the Scandinavian peninsula and Finland. Denmark was ice-free. But what is now the Baltic stretched as an open sound from the North Sea across southern Finland and northwestern Russia to the Arctic Ocean. From this ocean as well as the remaining glaciers emanated a low temperature, in which there throve arctic forms of life, especially the small shell *Yoldia arctica,* which flourishes only where the sea bottom temperature ranges between 1° plus and 2° minus Centigrade. This great, chilly sound of some sixteen to ten thousand years ago is known as the Yoldia Sea. Denmark and the German coast must still have been cold, as the remains of the sub-arctic flora show, and were without human inhabitants.

232. THE LATE PALÆOLITHIC ANCYLUS OR MAGLEMOSE PERIOD

Around 10,000 B.C., as western Europe was entering upon the Azilian aftermath of the Palæolithic, the land at both ends of the Yoldia Sea was elevated sufficiently to cut this off from the open ocean. The Baltic was thus closed at both ends, instead of neither, as before, or one only, as now. The rivers continued to flow into it; it became brackish and almost fresh, and the fauna changed. The distinctive fossil shell became *Ancylus fluviatilis,* from which the great lake is known as the Ancylus Lake. The Scandinavian flora once more included real trees, chiefly pines and birches.

Man occupied south Sweden and Denmark in the Ancylus period. At Maglemose have been found his remains during this Scandinavian equivalent of the Azilian. Here he appears to have lived on rafts floating on a lake, which subsequently filled with peat. Whatever fell overboard, became embedded in the growing peat and was preserved. The inhabitants cut their raft logs and firewood with axes of bone and elk horn, some of them perforated for handles. They had bone fish-hooks, harpoons with single and double rows of barbs, and still others with slits for the insertion of minute flint blades, much like saw teeth. Some of the microlithic points have also been found. All of the stone was chipped; there is no trace of polishing other than of bone and antler. They engraved, sometimes in a deteriorated style of Magdalenian naturalism, sometimes with simple geometric ornaments. The dog accompanied these people, perhaps was already half tame. Remains similar to those of Maglemose have been found in several of the Baltic lands.

233. THE EARLY NEOLITHIC LITORINA OR KITCHENMIDDEN PERIOD

Within perhaps two thousand years, the Baltic opened again as at present, grew saltier, and took on much its present conditions, except for being somewhat larger. The water warmed, and *Litorina litorea* and the oyster became the characteristic molluscs. The climate was milder than before, and the forests changed from birches and pines to oaks.

The men of this period lived largely on oysters and scallops, whose shells piled up about their habitations by millions, forming ridge-like mounds sometimes hundreds of yards long. These are the Kjökkenmöddings, or Kitchenmiddens, refuse heaps or shell heaps. Among the shells are ashes, bones of the land animals and birds that were hunted, and lost or broken utensils. Some of the Maglemose implements continued to be used, such as bone awls, chisels, and fish-hooks. Others were no longer made: harpoons, the minute flint blades, and engraved objects. But new forms had come in: above all, pottery and the stone ax—evidences that this was an early period of the Neolithic, even though polished stone was still lacking. The ax or "splitter" was chipped—hewn is really a more fitting term—oval or trapezoidal in outline, the cutting edge convex or straight. It seems to have been lashed to an elbow handle: there was no groove or perforation. The pottery was coarse, dark, and undecorated except sometimes for rows of crude dot impressions along the edge. Another new implement was a handled bone comb with four or five teeth. It appears to have been employed for carding rather than hair-dressing. The bow was in use: arrowheads bore a cutting edge in front. The dog was the only domestic or semi-domesticated animal; probably a Spitz-like breed, perhaps of jackal origin. He managed to gnaw most of the bones that have been preserved in the shell layers.

Approximately contemporary with the Danish kitchenmiddens, and similar to them in their cultural repertoire, are a Spanish phase known as Asturian and the Campignian of northern France. The Asturian remains are also shell deposits. Their lower levels contain bones of cattle that had perhaps been domesticated; middle strata add the sheep; and in the uppermost, pottery appears. The northern ax is replaced by a hand-held pick. The Campignian possessed hewn axes or splitters similar to the Danish ones; pottery; domesticated cattle; and seems to have made a beginning of agriculture with barley. It would thus seem that pottery and the hewn ax were the characteristic general criteria of this Early Neolithic stage, with domesticated animals and agriculture coming in earlier in southern and middle Europe, whereas the northerners continued to depend longer on shellfish and game.

234. The Full Neolithic and Its Subdivisions in Scandinavia

Two or three thousand years passed, and by about 5500 B.C. the Scandinavian climate had become slightly cooler once more, the oaks gave way to birches and pines, the Baltic lost some of its salt content, and the oyster grew scarcer. The Kitchen-midden or Litorina period of the Early Neolithic was over; the Full Neolithic had arrived. Axes were polished, cattle kept, grain grown. Four stages of development are discernible.

5500-3500 B.C. Burials in soil. Sharp-butted axes.

3500-2500 B.C. Burials in dolmens, chambers of three to five flat upright stones, roofed with one slab. Narrow-butted axes.

2500-2100 B.C. Burials in *Allées couvertes* or *Ganggraeber*, chambers of dolmen type but larger and with a roofed corridor approach. Thick-butted axes. Some copper. Beautifully neat and even chipping of flint daggers, lance heads, arrowpoints, some suggesting by their forms that they may be flint imitations of bronzes already in use on the Mediterranean. The same is true of perforated stone axes, ground into ornamental curves, such as are natural in cast metal.

2100-1900 B.C. Burials in stone cysts, progressively decreasing in size. Thick-butted axes. Chipped daggers and curving axes reminiscent of bronze forms continue. The first bronze appears, its percentage of tin still low.

235. The Bronze Age and Its Periods in Scandinavia

Bronze reached the Scandinavian region late, as a well developed art, and its working soon showed a high degree of technical and æsthetic excellence. But arts that in the Orient had appeared almost simultaneously with bronze—writing, masonry, wheel turning of pottery—did not reach Scandinavia until after bronze had been superseded by iron there. The consequence was that the Northern culture remained on the whole thoroughly barbarous. And yet, perhaps on account of this very backwardness, an aloofness resulted which drove the Scandinavian bronze-workers to follow their own tastes and develop their own forms and styles, often with taste as exquisite as simple. In other words, a local culture grew, much like the analogous local cultures in America which have been traced in previous chapters. Yet the basis of this Northern bronze culture was southern and Oriental invention; and the south and east continued to influence Scandinavia. The northern safety-pin, for instance, underwent the same stages as the southern one: backs that were first straight and narrow, then sheetlike, then bowed, with the ends enlarging to great buckles or disks. But the southern fibula, whatever its type or period, was one-piece and elastic, the northern at all times made of two separate parts, and without real spring.

Connection with other countries is evident from the Northern bronze itself, at least the tin of which, if not the alloy, was imported. Yet the finds of the Scandinavian Bronze Age, numerous as they are, do not contain a single specimen that can be traced to Egypt or to Greece. Even pieces made in middle Europe are rare. And molds, ladles, unfinished castings, prove that the North cast its own bronze on the spot. First knowledge of the art had evidently seeped in from the region of Switzerland, Austria, and Hungary, which in turn derived it from the Italian and Balkan peninsulas, which at a still earlier time had learned it from Egypt or Asia.

It appears, then, that it would be equally erroneous to regard the Scandinavian Bronze Age as an independent development or to regard it as a mere copy or importation from the Orient. It was neither; or, in a sense, it was both. Its origin lies in the great early focal point of civilization in the Near East; its specific form, the qualities which it took on, are its own. The disseminated ingredient, the basis due to diffusion, must be admitted as fully as the elements of local development which mark off a distinct Northern culture-area, or sub-focus of cultural energy.

This interplay of forces is typical also of the Iron and New Stone Ages, and it is the number of local centers of culture growth, their increasingly rapid flourishing as time went on, and the multiplication of connections between countries, that render the prehistory of Eur-Asiatic civilization so difficult. If enough were known of the life of the Palæolithic, it is probable that a similar though less intricate tangle of developments might be evident for that period also.

The resemblance to the interrelations of areas within America is manifest. The Southwest stands to southern Mexico as Scandinavia does to the Orient: suffused by it, stimulated by it, created by it, almost; yet at all times with a provincial cast of its own. The Southwestern specialist can trace a continuous evolution on the spot which tempts him to forget the obvious and indisputable Mexican origins. The Mexicanist, on the other hand, impressed by the practical identity of fundamentals and close resemblance in many details, is likely to see Southwestern culture only as a mutilated copy of the higher civilization to the south. Correct understanding requires the balancing of both views.

Close equivalents of the culture-areas of American ethnologists are in fact recognized by European archæologists. Thus, Déchelette distinguishes seven "geographical provinces" in the Bronze Age of Europe, as follows: 1, *Ægean* (Greece, islands, coast of Asia Minor); 2, *Italian* (with Sicily and Sardinia); 3, *Iberian* (Spain, Portugal, Balearics); 4, *Western* (France, Great Britain, Ireland, Belgium, southern Germany, Switzerland, Bohemia); 5, *Danubian* (Hungary, Moravia, the Balkan countries); 6, *Scandinavian* (including northern Germany and the Baltic coast); 7, *Uralic* (Russia and western Siberia).

The fourteen hundred years generally allowed the Scandinavian Bronze Age are divisible into five or six periods,[1] which become progressively shorter.

2500-2100, Neolithic, with copper, and 2100-1900, with occasional bronze, have already been mentioned.

1900-1600 B.C. Burial in stone cysts. Little decoration of bronze, and that only in straight lines. Flat ax heads or celts. Triangular daggers. Daggers mounted on staves like ax heads.

1600-1400 B.C. Occasional cremation of corpses, the ashes put into very small cysts. Decoration of bronze in engraved spirals. Flanged and stop-ridged axes. Swords. Straight fibulas.

1400-1050 B.C. Cremation general. Axes of socketed type. Bowed fibulas. Bronze vessels with lids.

1050-850 B.C. Spiral ornament decaying. Fibulas with two large bosses. Ship-shaped razors.

850-650 B.C. Ornamentation plastic, rather than engraved, often produced in the casting. Rows of concentric circles and other patterns replace spirals. Fibulas with two large disks. Knives with voluted antennæ-like handles. Sporadic occurrence of iron.

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[1] In France, four or five periods are distinguished: 2500-1900; 1900-1600; 1600-1300; 1300-900 B.C. The first of these is a time of copper rather than bronze, with northern France still Neolithic. If five periods are admitted, an era around 1300 B.C. is recognized as a separate division.

650-500 B.C. Iron increasing in use; decorative bronze deteriorating.

236. Problems of Chronology

The dating of events in the Neolithic and Metal Ages is of much more importance than in the Palæolithic. Whether an invention was made in Babylonia in 5000 or in 3000 B.C. means the difference between its occurring in the hazy past of a formative culture or in a well advanced and directly documented phase of that culture. If the dolmens and other megalithic monuments of northern Europe were erected about 3000 B.C., they are older than the pyramids of Egypt and contemporaneous with the first slight unfoldings of civilization in Crete and Troy. But if their date is 1000 B.C., they were set up when pure alphabetic writing and iron and horses were in use in western Asia, when Egypt was already senile, and the Cretan and Trojan cultures half forgotten. In the one case, the megaliths represent a local achievement, perhaps independent of the stone architecture of Egypt; in the other event, they are likely to be a belated and crudely barbarian imitation of this architecture.

But in the Palæolithic, year dates scarcely matter. Whether the Mousterian phase culminated 25,000 or 75,000 years ago is irrelevant: it was far before the beginning of historic time in either case. If one sets the earlier date, the Chellean and Magdalenian are also stretched farther off; if the later, it is because one shrinks his estimate of the whole Palæolithic, the sequence of whose periods remains fixed. It is really only the relative chronology that counts within the Old Stone Age. The durations are so great, and so wholly prehistoric, that the only value of figures is the vividness of their concrete impression on the mind, and the emphasis that they place on the length of human antiquity as compared with the brevity of recorded history. Palæolithic datings might almost be said to be useful in proportion as they are not taken seriously.

At the same time, the chronology of the Palæolithic is aided by several lines of geological evidence that are practically absent for the Neolithic and Bronze Ages: thickness of strata, height of river deposits and moraines, depth of erosion, species of wild animals. The Neolithic is too brief to show notable traces of geological processes. Its age must therefore be determined by subtler means: slight changes in temperature and precipitation; the thickness of refuse deposits; and above all, the linking of its latter phases to the earliest datable events in documentary or inscriptional history. By these aids, comparison has gradually built up a chronology which is accepted as approximate by most authorities. This chronology puts the beginning of bronze in the Baltic region at about 1900 B.C., in Spain at 2500, the first Swiss lake-dwellings at 4000, the domestication of cattle and grain in middle Europe around 5500, the first pottery-bearing shellmounds about 8000 B.C. Of course, these figures must not be taken as accurate. Estimates vary somewhat. Yet the dates cited probably represent the opinion of the majority of specialists without serious deviation: except on one point, and that an important one.

This point is the hinge from the end of prehistory to the beginning of history: the date of the first dynasties of Egypt and Babylonian Sumer. On this matter, there was for many years a wide discrepancy among Orientalists. The present tendency is to set 3400 or 3315 B.C., with an error of not over a century, as the time when upper and lower Egypt began to be ruled by a single king, Mena, the founder of the ''first dynasty''; 2750 as the date of Sargon of Akkad, the first consolidator and empire-builder in the Babylonian region; and about 3100 as the period of the earliest discovered datable remains from the Sumerian city states.

The longer reckoning puts the Egyptian first dynasty back to about 4000; according to some, even earlier; and Sargon to 3750. This last date rests on the discovery by Nabonidus, the last king of Babylon, successor of Nebuchadnezzar in the sixth century B.C., of a deeply buried inscription in a foundation wall erected by Naram-sin, son of Sargon. Nabonidus had antiquarian tastes, and set his archæologists and historians to compute how long before him Naram-sin had lived. Their answer was 3,200 years—the thirty-eighth century B.C., we should say; and this figure Nabonidus had put into an inscription which has come down to us. All this looks direct and sure enough. But did the king's scholars really know when they told him that just 3,200 years had elapsed since his predecessor's reign, or were they guessing? The number is a round one: eighty forties of years, such as the Old Testament is fond of reckoning with. The trend of modern opinion, based on a variety of considerations, is that the Babylonian historians were deceiving either the king or themselves.

The bearing of the discrepancy is this. The scholars who are in more or less agreement that bronze reached Mediterranean Europe about 2500 and Northern Europe about 1900, were generally building on the longer chronology of the Near East. They were putting Mena around 4000 and Sargon in 3750. This allowed an interval of over a thousand years in which bronze working could have been carried to Spain, and two thousand to Denmark. With the shorter chronology for Egypt and Babylonia, the time available for the transmission has to be cut down by a thousand years. Should the European dates, therefore, be made correspondingly more recent? Or is the diminished interval still sufficient—that is, might a few centuries have sufficed to carry the bronze arts from the Orient to Sicily and Spain, and a thousand years to bear them to Scandinavia? The interval seems reasonable, and is accordingly the one here accepted. But it is possible that if the shorter chronology becomes proved beyond contradiction for Egypt and Babylonia, the dates for the Neolithic and Bronze Ages of Europe may also have to be abbreviated somewhat.

One famous time-reckoning has in fact been made by the Dane Sophus Müller, who, without basing very much on any Oriental chronology, shortens all the prehistoric periods of Europe. His scheme of approximate dating is reproduced, with some simplifications, in Figure 42. It will be seen that he sets the second or dolmen period of the Full Neolithic in Scandinavia from about 1800 to 1400 B.C., whereas the more usual reckoning puts it at 3500 to 2500; his earliest Kitchenmidden date is 4000, as against 8000.

237. PRINCIPLES OF THE PREHISTORIC SPREAD OF CULTURE

This chronology has much to commend it besides its almost daring conservatism; especially the clarity of its consistent

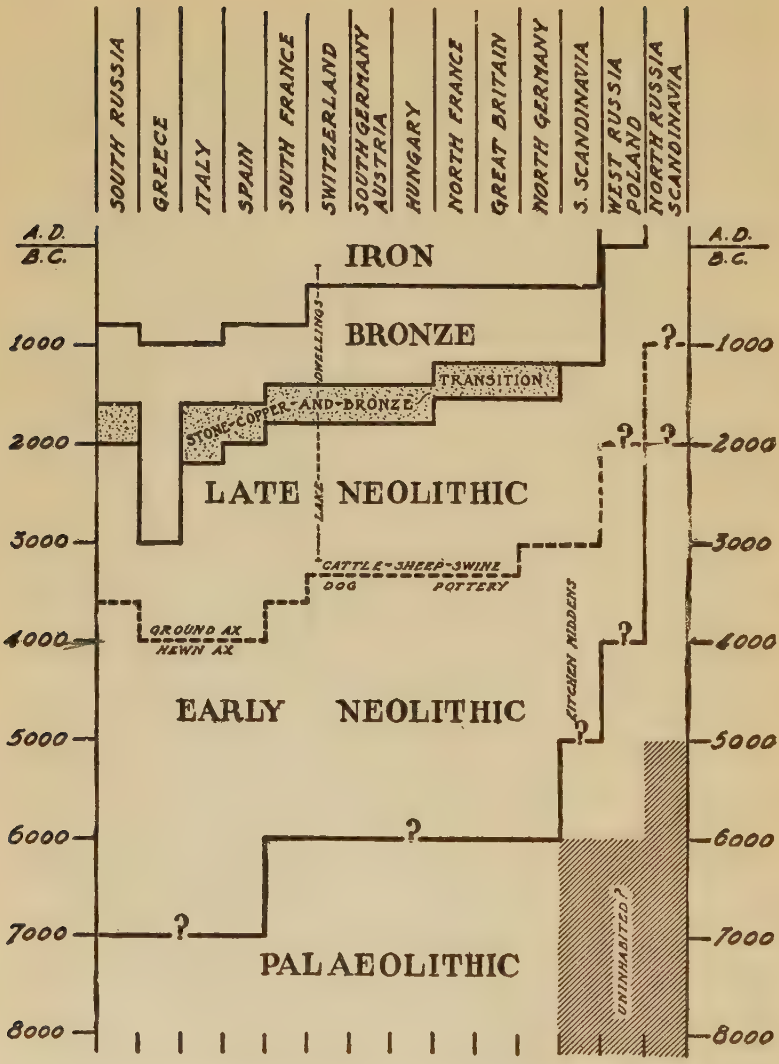

FIG. 42. The development of prehistoric civilization in Europe. Simplified from Sophus Müller. His absolute dates are generally considered too low, but their relative intervals are almost undisputed. The diagram shows very clearly the persistent cultural precedence of the countries nearest the Orient, and the lagging of western and especially of northern Europe.

recognition of certain cultural processes. Five principles and three extensions are set up by Müller:

1. The south [of Europe, with the Near East] was the vanguard and dispensing source of culture; the peripheral regions, especially in the north [of Europe] followed and received.
2. The elements of southern culture were transmitted to the north only in reduction and extract.
3. They were also subject to modifications.
4. These elements of southern culture sometimes appeared in the remoter areas with great vigor and new qualities of their own.
5. But such remote appearances are later in time than the occurrence of the same elements in the south.
6. Forms of artifacts or ornaments may survive for a long time with but little modification, especially if transmitted to new territory.
7. Separate elements characteristic of successive periods in a culture center may occur contemporaneously in the marginal areas, their diffusion having occurred at different rates of speed.
8. Marginal cultures thus present a curious mixture of traits whose original age is great and of others that are much newer; the latter, in fact, occasionally reach the peripheries earlier than old traits.

The basic idea of these formulations is that of the gradual radiation of culture from creative focal centers to backward marginal areas, without the original dependence of the peripheries wholly precluding their subsequent independent development. It is obvious that this point of view is substantially identical with that which has been held to in the presentation of native American culture in the preceding chapter.

It is only fair to say that a number of eminent archæologists combat the prevalent opinion that the sources of European Neolithic and Bronze Age civilization are to be derived almost wholly from the Orient. They speak of this view as an "Oriental mirage." They see more specific differences than identities between the several local cultures of the two regions, and tend to explain the similarities as due to independent invention.

Since knowledge of ancient cultures is necessarily never complete, there is a wide range of facts to which either explanation is, theoretically, applicable. But the focal-marginal diffusion interpretation has the following considerations in its favor.

Within the fully historic period, there have been numerous undoubted diffusions, of which the alphabet, the week, and the true arch may be taken as illustrations. At least in the earlier portion of the historic period, the flow of such diffusions was regularly out of the Orient; which raises a considerable presumption that the flow was in the same direction as early as the Neolithic. On the other hand, indubitably independent parallelisms are very difficult to establish within historic areas and periods, and therefore likely to have been equally rare during prehistory.

Then, too, the diffusion interpretation explains a large part of civilization to a certain degree in terms of a large, consistent scheme. To the contrary, the parallelistic opinion leaves the facts both unexplained and unrelated. If the Etruscans devised the true arch and liver divination independently of the Babylonians, there are two sets of phenomena awaiting interpretation instead of one. To say that they are both "natural" events is equivalent to calling them accidental, that is, unexplainable. To fall back on instinctive impulses of the human mind will not do, else all or most nations should have made these inventions.

Of course it is important to remember that no sane interpretation of culture explains everything. We do not know what caused the true arch to be invented in Babylonia, hieroglyphic writing in Egypt, the alphabet in Phœnicia, at a certain time rather than at another or rather than in another place. The diffusion point of view simply accepts certain intensive focal developments of culture as empirically given by the facts, and then relates as many other facts as possible to these. Every clear-minded historian, anthropologist, and sociologist admits that we are still in ignorance on the problems of what caused the great bursts of higher organization and original productiveness of early Egypt and Sumer, of Crete, of ancient North China, of the Mayas, of Periclean Athens. We know many of the events of civilization, know them in their place and order. We can infer from these something of the processes of imitation, conservatism, rationalization that have shaped them. We know as yet as good as nothing of the first or productive causes of civilization.

It is extremely important that this limitation of our understanding be frankly realized. It is only awareness of darkness that brings seeking for light. Scientific problems must be felt before they can be grappled. But within the bounds of our actual knowledge, the principle of culture derivation and transmission seems to integrate, and thus in a measure to explain, a far greater body of facts than any other principle—provided it is not stretched into an instrument of magic and forced to explain everything.

CHAPTER XV

THE GROWTH OF CIVILIZATION: OLD WORLD HISTORY AND ETHNOLOGY

238. The early focal area.—239. Egypt and Sumer and their background.—240. Predynastic Egypt.—241. Culture growth in dynastic Egypt.—242. The Sumerian development.—243 The Sumerian hinterland.—244. Entry of Semites and Indo-Europeans.—245. Iranian peoples and cultures.—246. The composite culture of the Near East.—247. Phœnicians, Aramæans, Hebrews.—248. Other contributing nationalities.—249. Ægean civilization.—250. Europe.—251. China.—252. Growth and spread of Chinese civilization.—253. The Lolos.—254. Korea.—255. Japan.—256. Central and northern Asia.—257. India.—258. Indian caste and religion.—259. Relations between India and the outer world.—260. Indo-China.—261. Oceania.—262. The East Indies.—263. Melanesia and Polynesia.—264. Australia.—265. Tasmania.—266. Africa.—267. Egyptian radiations.—268. The influence of other cultures.—269. The Bushmen.—270. The West African culture-area and its meaning.—271. Civilization, race, and the future.

238. The Early Focal Area

The prehistoric archæology of Europe and the Near East, outlined in the last chapter, besides arriving at a tolerable chronology, reveals a set of processes of which the outstanding one is the principle of the origin of culture at focal centers and its diffusion to marginal tracts. Obviously this principle should apply in the field of history as well as prehistory, and should be even more easily traceable there.

In the Western Hemisphere it is plain that the great hearth of cultural nourishment and production has been Middle America—the tracts at the two ends of the intercontinental bridge, the Isthmus of Panama. That a similarly preëminent focal area existed in the Eastern Hemisphere has been implied over and over again in the pages that immediately precede this one, in the references to the priority of Egypt and Babylonia—the countries of the Nile and of the Two Rivers. These two lands lie at no great distance from each other: they are closer than Mexico and Peru. Like these two, they are also connected by a strip of mostly favorable territory—the "Fertile Crescent" of Palestine, Syria, and northern Mesopotamia. Curiously the two countries also lie in two continents connected by a land bridge: the Isthmus of Suez is a parallel to that of Panama.

Both in Egypt and in Babylonia we find a little before 3000 B.C. a system of partly phonetic writing, which, though cumbersome by modern standards, was adequate to record whatever was spoken. Copper was abundant and bronze in use for weapons and tools. Pottery was being turned on wheels. Economic life was at bottom agricultural. The same food plants were grown: barley and wheat; similar beer brewed from them. The same animals were raised: cattle, swine, sheep, goats; with the ass for transport. Architecture was in sun-dried brick. Considerable walled cities had arisen. Their rulers struggled or attained supremacy over one another as avowed kings with millions of subjects. A regulated calendar existed by which events were dated. There were taxes, governors, courts of law, police protection, and social order. A series of great gods, with particular names and attributes, were worshiped in temples.

239. EGYPT AND SUMER AND THEIR BACKGROUND

It is scarcely conceivable that these two parallel growths of civilization, easily the most advanced that had until then appeared on earth, should have sprung up independently within a thousand miles of each other. Had Sumerian culture blossomed far away, say on the shores of the Pacific instead of the lower Euphrates, its essential separateness, like that of Middle American civilization, might be probable. But not only is the stretch of land between Babylonia and Egypt relatively short: it is, except in the Suez district, productive and pleasant, and was settled fairly densely by relatively advanced nations soon after the historic period opens or even before. The same is true of the adjoining regions. Canaan, Syria, Mesopotamia, Troy, Crete, Elam, southwestern Turkistan, had all passed beyond barbarism and into the period of city life during the fourth and third millenia B.C. This cannot be a series of coincidences. Evidently western Asia, together with the nearest European islands and the adjacent fertile corner of Africa, formed a complex but connected unit, a larger hearth in which culture was glowing at a number of points. It merely happened that a little upstream from the mouths of the Nile and of the Euphrates the development flamed up faster during the fifth and fourth millenia. The causes can only be conjectured. Perhaps when agriculture came to be systematically instead of casually conducted, these annually overflowed bottom lands proved unusually favorable; their population grew, necessitating fixed government and social order, which in turn enabled a still more rapid growth of numbers, the fuller exploitation of resources, and division of labor. This looks plausible enough. But too much weight should not be attached to explanations of this sort: they remain chiefly hypothetical. That culture had however by 3000 B.C. attained a greater richness and organization in Egypt and in the Babylonian region than elsewhere, are facts, and can hardly be anything but causally connected facts. These two civilizations had evidently arisen out of a common Near Eastern high level of Neolithic culture, much as the peaks of Mexico and Peru arose above the plateau of Middle American culture in which they were grounded.

Of course this means that Egypt and Sumer did not stand in parental-filial relation. They were rather collateral kin—brothers, or better, perhaps, the two most eminent of a group of cousins. Attempts to derive Egyptian hieroglyphic from Babylonian Cuneiform writing, and vice versa, have been rejected as unproved by the majority of unbiased scholars. But it is likely that at least the idea of making legible records, of using pictorial signs for sounds of speech, was carried from one people to the other, which thereupon worked out its own symbols and meanings. Just so, while the Phœnician alphabet has never yet been led back to either Egyptian, Cuneiform, Cretan, or Hittite writing with enough evidence to satisfy more than a minority fraction of the world of scholarship, it seems incredible that this new form of writing should have originated uninfluenced by any of the several systems which had been in current use in the near neighborhood, in part in Phœnicia itself, for from one to two or three thousand years. Such a view denies neither the essentially new element in Phœnician script nor its cultural importance. It does not consider the origin of the alphabet explained away by a reference to another and earlier system of writing. It does bring the alphabet into some sort of causal relation with the other systems, without merging it in them. It is along lines like this that the relation of early Egypt and Babylonia to each other and to the other cultures of the ancient Near East must be conceived.

240. PREDYNASTIC EGYPT

Egyptian civilization was already in full blown flower at the time of the consolidation of Lower and Upper Egypt under the first dynasty in the thirty-fourth century. Its developmental stages must have reached much farther back. Hieroglyphic writing, for instance, had taken on substantially the forms and degree of efficiency which it maintained for the next three thousand years. An elaborate, conventional system of this sort must have required centuries for its formative stages. A non-lunar 365-day calendar was in use. This was easily the most accurate and effective calendar developed in the ancient world, and furnished the basis of our own. It erred by the few hours' difference between the solar and the assumed year. This difference the Egyptians did not correct but recorded, with the result that when the initial day had slowly swung around the cycle of the seasons, they reckoned a "Sothic year" of 1,461 years. One of these was completed in 2781; which gives 4241 B.C. as the date of the fixing of the calendar. This is considered the earliest exactly known date in human history. Of course, a calendar of such fineness cannot be established without long continued observations, whose duration will be the greater for lack of astronomical instruments. Centuries must have elapsed while this calendar was being worked out. Nor would oral tradition be a sufficient vehicle for carrying the observations. Permanent records must have been transmitted from generation to generation; and these presuppose stability of society, enduring buildings, towns, and a class with leisure to devote to astronomical computations. It is safe therefore to set 4500 B.C. as the time when Egypt had emerged from a tribal or rural peasant condition into one that can be called "civilized" in the original meaning of that word: a period of city states, or at least districts organized under recognized rulers. From 4500 on, then, is the time of the Predynastic Local Kingdoms.

Beyond this time there must lie another: the Predynastic Tribal period, before towns or calendars or writing or metal, when pottery was being made, stone ground, boats built, plants and animals being domesticated—the typical pure Neolithic Age, in short. Yet with all its prehistoric wealth, Egypt has not yet produced any true Neolithic remains. It is hardly likely that the country was uninhabited for thousands of years; much more probably have Neolithic remains been obliterated. This inference is strengthened by the paucity and dubiousness of Upper Palæolithic artifacts in Egypt. Lower Palæolithic flint implements are abundant, just as are remains from the whole of the period of metals. What has happened to the missing deposits and burials of the Upper Palæolithic and Neolithic that fell between?

Apparently they have been buried on the floor of the Nile valley under alluvial deposits. The Eolithic and Lower Palæolithic implements are found on the plateau through which the valley stretches; also cemented into conglomerate formed of gravel and stone washed down from this plateau and cut into terraces by the Nile when it still flowed from 30 to 100 feet higher than at present; and on the terraces. Just when these terraces were formed, it is difficult to say in terms of European Pleistocene periods; but not later than the third glacial epoch, it would seem, and perhaps as early as the second. As the Chellean of Europe is put after the third glaciation in the chronology followed in this book, the antiquity of the first flints used, and perhaps deliberately shaped, in Egypt, is carried back to an extremely high antiquity by the specimens imbedded in the terrace cliffs.

About the time of the last glaciation—the Mousterian or end of the Lower Palæolithic in Europe—the Nile ceased cutting down through the gravels that bordered it and began to build up its bed and its valley with a deposit of mud as it does to-day. From excavations to the base of dated monuments it is known that during the last 4,000 years this alluvium has been laid down at the rate of a foot in 300 years in northern Egypt. As it there attains a depth of over a hundred feet, the process of deposition is indicated as having begun 30,000 or more years ago. Of course no computation of this sort is entirely reliable because various factors can enter to change the rate; but the probability is that, other things equal, the deposition would have been slower at first than of late, and the time of the aggrading correspondingly longer. In any event geologists agree that their Recent—the last 10,000 years or so—is insufficient, and that the deposition of the floor of the Nile valley must have begun during what in Europe was part of the Würm glaciation.

This is the period of transition from Lower to Upper Palæolithic (§ 69, 70, 213) in Europe. The disappearance of Upper Palæolithic remains in Egypt is most plausibly explained by the fact that the Upper Palæolithic, just as later the Neolithic, was indeed represented in Egypt, very likely flourishingly, but that in the mild climate its artifacts were lost or interred on or near the surface of the valley itself and have therefore long since been covered over so deep that only future lucky accidents, like well-soundings, may now and then bring a specimen to light.

For the Neolithic, there actually are such discoveries: bits of pottery brought up from borings, 60 feet deep in the vicinity of one of the monuments referred to, 75 and 90 feet deep at other points in lower Egypt. The smallest of these figures computes to a lapse of 18,000 years—nearly twice as long as the estimated age of the earliest pottery in Europe. It is always necessary not to lay too much reliance on durations calculated solely from thickness of strata, whether these are geological or culture-bearing. But in this case general probability confirms, at least in the rough. In 4000 B.C., when Egypt was beginning to use copper, western Europe was still in its first phase of stone polishing; in 1500 B.C., when Egypt was becoming acquainted with iron, Europe was scarcely yet at the height of its bronze industry. If the fisher folk camped on their oyster shells on the Baltic shores were able to make pottery by 8000 B.C., there is nothing staggering in the suggestion that the Egyptians knew the art in 16,000 B.C. They have had writing more than twice as long as the North Europeans.

The dates themselves, then, need not be taken too literally. They are calculated from slender even though impressive evidence and subject to revision by perhaps thousands of years. But they do suggest strongly the distinct precedence of northern Africa, and by implication of western Asia, over Europe in the

Neolithic, as precedence is clear in the Bronze and early Iron Ages and indicated for the Lower Palæolithic.

If, accordingly, the beginning of the Early Neolithic—the age of pottery, bow, dog—be set for Egypt somewhere around 16,000 B.C., about coeval with the beginning of the Magdalenian in middle western Europe (§ 215), the Full Neolithic, the time of first domestication of animals and plants and polishing of stone, could be estimated at around 10,000 B.C., when Europe was still lingering in its epi-Palæolithic phase (§ 216). One can cut away several thousand years and retain the essential situation unimpaired: 8000, or 7000 B.C., still leaves Egypt in the van; helps to explain the appearance of eastern grains and animals in Europe around 6000-5000 B.C.; and, what is most to the point, allows a sufficient interval for agriculture and the allied phases of civilization to have reached the degree of development which they display when the Predynastic Local Kingdoms drift into our vision around 4500 B.C. A long Full Neolithic, then, is both demanded by the situation in Egypt and indicated by such facts as there are; a long period in which millet, barley, split-wheat, wheat, flax, cattle, sheep, and asses were gradually modified and made more useful by breeding under domestication. This Full Neolithic, or its last portion, was the Predynastic Tribal Age of Egypt; which, when it passed into the Predynastic Local Kingdoms phase about 4500 B.C., had brought these plants and animals substantially to their modern forms, and had increased and coördinated the population of the land to a point that the devising of calendar, metallurgy, writing, and kingship soon followed.

241. Culture Growth in Dynastic Egypt

The story of the growth of Egyptian civilization during the Dynastic or historic period is a fascinating one. There were three phases of prosperity and splendor. The first was the Old Kingdom, 3000-2500, culminating in the fourth dynasty of the Great Pyramid builders, in the twenty-ninth century. The second was the Middle or Feudal Kingdom, with its climax in the twelfth dynasty, 2000-1788. After the invasion of the Asiatic Hyksos in the seventeenth century, the New Empire of the eighteenth and nineteenth dynasties arose, whose greatest extension fell in the reign of Thutmose III, 1501-1447, although the country retained some powers of offensive for a couple of centuries longer. There followed a slow nationalistic decline, a transient seventh century conquest by Assyria, a brief and fictitious renascence supported by foreign mercenaries, and the Persian conquest of 525 B.C., since which time Egypt has never been an independent power under native rulers. A waning of cultural energy, at least relatively to other peoples, had set in before the military decline. By 1000 B.C. certainly, by 1500 perhaps, Egypt was receiving more elements of civilization than she was imparting. She still loomed wealthy and refined in contrast with younger nations; but these were producing more that was new.

Copper smelted from the ores of the Sinai peninsula had apparently come into use by 4000, but remained scarce for a long time. The first dynasty had some low grade bronze, by 2500 bronze containing a tenth of tin was in use. Iron was introduced about 1500 or soon after, but for centuries remained a sparing Asiatic import. In fact, the conservatism that was settling over the old age of the civilization caused it to cling with unusual tenacity to bronze. As late as Ptolemaic and Roman times, when the graves of foreigners abounded in iron, those of Egyptians were still prevailingly bronze furnished.

Quite different must have been the social psychology three thousand years earlier. The first masonry was laid in place of adobe brick to line tomb walls in the thirty-first century; and within a century and a half the grandest stone architecture in human history had been attained in the Pyramid of Cheops. This was a burst of cultural energy such as has been equalled only in the rise of Greek art or modern science.

Glass making seems to have been discovered in Egypt in the early dynasties and to have spread from there to Syria and the Euphrates. The earliest glass was colored faïence, at most translucent, and devoted chiefly to jewelry, or to surfacing brick. Later it was blown into vessels, usually small bottles, and only gradually attained to clearness. From western Asia the art was carried to Europe, and, in Christian times, to China, which at first paid gem prices for glass beads, but later was perhaps stimulated by knowledge of the new art into devising porcelain—a pottery vitrified through.

The horse first reached Egypt with the Hyksos. With it came the war chariot. Wheeled vehicles seem to have been lacking previously. The alphabet, the arch, the zodiac, coinage, heavy metal armor, and many other important inventions gained no foot-hold in Egypt until after the country had definitely passed under foreign domination. The superior intensity of early Egyptian civilization had evidently fostered a spirit of cultural self-sufficiency, analogous to that of China or Byzantine Greece, which produced a resistance to innovation from without. At the same time, inward development continued, as attested by numerous advances in religion, literature, dress, the arts, and science when the Old Kingdom and New Empire are compared. In the eleventh and twelfth dynasties, for instance, the monarchy was feudal; in the eighteenth lived the famous monotheistic iconoclastic ruler Ikhnaton.

The civilization of ancient Egypt was wholly produced and carried by a Hamitic-speaking people. This people has sometimes been thought to have come from Asia, but its Hamitic relatives hold Africa from Somaliland to Morocco even to-day, and there is no cogent reason to look for its ancestors outside that continent.

242. The Sumerian Development

The story of Babylonia is less completely known than that of Egypt because as a rockless land it was forced to depend on sun-dried brick, because the climate is less arid, and also because of its position. Egypt was isolated by deserts, Babylonia open to many neighbors, and so was invaded, fought over, and never unified as long as Egypt. The civilization was therefore never so nationally specific, so concentrated; and its records, though abundant, are patchy. Babylonia, the region of the lower Euphrates and Tigris, was the leading culture center of Asia in the third and second millenia before Christ; and while mostly a Semitic land in this period, its civilization was the product of another people, the Sumerians, established near the mouth of the two rivers in the fourth millenium. It was the Sumerians who in this thousand years worked out the Cuneiform or wedge-shaped system of writing—mixedly phonetic and ideographic like the Egyptian, but of wholly different values, so far as can be told to-day, and executed in straight strokes instead of the pictorial forms of Hieroglyphic or the cursive ones of its derivative Hieratic. It was the Semites who, coming in from the Arabian region, took over this writing, together with the culture that accompanied it. Their dependence is shown by the fact that they used characters with Sumerian phonetic values as well as by their retention of Sumerian as a sacred language, for which, as time went on, they were compelled to compile dictionaries, to the easement of modern archæologists.

Of the local origins of this Sumerian city-state civilization with its irrigation and intensive agriculture, nothing is known. It kept substantially abreast of Egypt, or at most a few centuries in arrears. In certain features, as the use of metals, it seems to have been in advance. Egypt is a long-drawn oasis stretched through a great desert. Babylonia lies adjacent to desert and highland, steppe and mountains. Within a range of a few hundred miles, its environment is far more varied. Not only copper but tin is said to have been available among neighboring peoples. So, too, Babylonia is likely to have had the early domestic animals—except perhaps cattle—earlier than Egypt, because it lay nearer to what seem to have been their native habitats. The result is that whereas Egyptian culture makes the superficial impression of having been largely evolved on the spot by the Egyptians, Sumerian culture already promises to resolve, when we shall know it better, into a blend to which a series of peoples contributed measurably. The rôle of the Sumerians, like that of their Semitic successors, was perhaps primarily that of organizers.

243. The Sumerian Hinterland

There are some evidences of these cultures previous to the Sumerian one or coeval with it. In Elam, the foot-hill country east of Sumer, a mound at Susa contains over 100 feet of culture-bearing deposits; in southern Turkistan, at Anau, 300 miles east of the Caspian sea, one is more than fifty feet deep. The date of the first occupancy of these sites has been set, largely on the basis of the rate of accumulation of the deposits—an unsafe criterion—at 18,000 and 8000 B.C. respectively. These dates, particularly the former, are surely too high. But a remote antiquity is indicated. Both sites show adobe brick houses and hand-made, painted pottery at the very bottom. Susa contains copper implements in the lowest stratum; Anau, three-fourths way to the base—in the same level as remains of sheep and camels. Still lower levels at Anau yielded remains of tamed cattle, pigs, and goats, while wheat and barley appear at the very bottom, before domesticated animals were kept. Whatever the date of the introduction of copper in these regions, it was very likely anterior to the thirty-first century, when bronze was already used by the Sumerians. These excavations therefore shed light on the Full Neolithic and Eneolithic or Transition phases of west Asiatic culture which must have preceded the Sumerian civilization known to us.

The languages of these early west Asiatic peoples have not been classified. Sumerian was non-Indo-European, non-Semitic, non-Hamitic. Some have thought to detect Turkish, that is Ural-Altaic, resemblances in it. But others find similarities to modern African languages. This divergence of opinion probably means that Sumerian cannot yet be safely linked with any other linguistic group. The same applies to Elamite, which is known from inscriptions of a later date than the early strata at Susa. What the Neolithic and Bronze Age people of Anau spoke there is no means of knowing. The region at present is Turkish, but this is of course no evidence that it was so thousands of years ago. The speech of the region might conceivably have been Indo-European, for it lies at the foot of the Persian plateau, which by the Iron Age was occupied by the Iranian branch of the Indo-Europeans, who are generally thought to have entered it from the north or northwest. But again there is not a shred of positive evidence for an Indo-European population at this wholly prehistoric period. The one thing that is clear is that the early civilization of the general west Asiatic area was not developed by the Semites who were its chief carriers later. This is a situation parallel to that obtaining in Europe and Asia Minor, whose civilization in the full historic period has been almost wholly in the hands of Indo-Europeans, whereas at the dawn of history the nations who were culturally in the lead, the Hittites, Trojans, Cretans, Lydians, Etruscans, and Iberians, were all non-Indo-European.

244. Entry of Semites and Indo-Europeans

The Semitic invasions seem to have proceeded from the great motherland of that stock, Arabia, whose deserts and half-deserts have been at all times like a multiplying hive. Some of the movements were outright conquests, others half-forceful penetrations, still others infiltrations. Several great waves can be distinguished. About 3000 there was a drift which brought the Akkadians, Sargon's people, into Babylonia, perhaps the Assyrians into their home up the Tigris, the Canaanites and Phœnicians into the Syrian region. About 2200 the Amorites flowed north: into Babylonia, where Babylon now sprang up and the famous lawgiver Hammurabi ruled; into Mesopotamia proper; and into Syria. Around 1400, the Aramæans gradually occupied the Syrian district, and the Hebrews began to dispossess the Canaanites. Around 700 still another wave brought the Chaldæans into Babylonia, to erect a great Semitic kingdom once more—that of Nebuchadnezzar. Then, for more than a thousand years, Arabia lay contained within herself, dammed perhaps by the Persian, Macedonian, Parthian, and Roman empires, until in the seventh century after Christ Mohammedanism led forth her peoples. A much earlier movement, at an unknown time, had brought the forefathers of the Abyssinians across the mouth of the Red Sea into Africa, and the Hyksos who overthrew the Middle Kingdom of ancient Egypt may have been Semites.

The Indo-Europeans entered southwest Asia later and permeated it more locally than the Semites. Soon after 2000 the Kassites or Kossæans intruded into Babylonia; they seem to have been Indo-Europeans, perhaps Iranians. Around 1500 the Mitanni were a power on the upper Euphrates between the Assyrians and the Hittites of Asia Minor. Their personal and god names as preserved in Assyrian Cuneiform inscriptions show them to have been an Iranian people. The latter are not recognizably referred to in their permanent home on the Iranian plateau until about 1000, but may well have settled there a thousand years earlier. Their close relatives, the Indic branch, are believed to have begun their entry of India about 2000-1500 B.C. or soon after.

245. IRANIAN PEOPLES AND CULTURES

By the seventh century B.C., the Iranians were civilized and strong enough to participate in the overthrow of Semitic Assyria, whose principal inheritors they became. From then on for over twelve hundred years, with only a century of interruption due to Alexander and his successors, a succession of Iranian powers dominated not only the plateau but Babylonia and Mesopotamia: Medes, Achæmenian Persians, Parthians, Sassanian Persians. A strong national consciousness was evolved and reinforced by a national religion—Zoroastrianism, Magism, Fire-worship, the Avestan faith, are some of its names. This Iranian religion endured nearly three thousand years, and still survives among a shrunken number of followers, notably the emigrant Parsis—that is, "Persians"—of India; and its basic ideas of the eternal conflict of good and evil, truth and lie, and of a single supreme deity of righteousness, have influenced many other cults, including Christianity. The long contact between Iran and the Tigris-Euphrates valley and their frequent political unity since 600 B.C. reacted favorably to the intensification of culture in the highlands; with the result that when the Arabs and later the Turks broke from their marginal homes into the old civilized parts of western Asia, they absorbed heavily from the long established cultures of Iran. Much of Arab and Turkish civilization is really Persian, and goes back ultimately to Semitic Babylonian and Sumerian origins.

Soon after the Iranians pushed southward out of the steppe on to the plateau east of the Caspian, other Indo-Europeans drove southward west of the Caspian and Black Sea; the Armenians into the seats which they have held ever since, the Kardouchoi into the Kurd country, tribes allied to the Balkan Thracians and the Phrygians into Asia Minor. The centuries before and after 1000 B.C. were the period of these movements, all of which failed to penetrate as deeply into the heart of the west Asiatic cultural center as had the Semitic inflows. Nor was the Indo-Europeanization of all the newly occupied territories as permanent as the corresponding Semitization. Asia Minor, which is now prevailingly Turkish, is the one area of consequence that in the historic period has been de-Indo-Europeanized in speech (§ 50).

246. The Composite Culture of the Near East

In this western end of Asia, then, from the Hellespont to Persia and from the Caucasus to the Arabian desert, beginning five thousand years ago and probably more, a motley of nations was thrown together—autochthonous peoples of several sorts, Semites, Indo-Europeans, possibly Ural-Altaians. Their contacts enabled each to acquire many of the new devices developed by the others, to combine these with their own attainments, and thus to be a source of culture stimulation over again for the others. The largest tract of rich lowland in the area was the Fertile Crescent which bowed from Jerusalem northward and eastward into Mesopotamia and then down the course of the Tigris and Euphrates to their mouths, and here, for several millenia, civilization tended to advance most intensively. Within this Crescent, again, its southeastern end, the drainable and irrigable alluvial plain of Babylonia, averaged in the lead from the earliest known Sumerian times until shortly before the Christian era. Yet political dominance often shifted elsewhere: to Egypt, which conquered to the Euphrates in the fifteenth century B.C.; to the Hittites of Asia Minor in the fourteenth and thirteenth; to the Assyrians of the middle Tigris in the twelfth and eleventh and again in the eighth and seventh centuries. Culturally, too, almost every one of the many nations or tracts comprised within the west Asiatic area developed a degree of independence; each added features or modified those which it borrowed; each gave to its local civilization a cast of its own, without losing touch with the others.

247. PHŒNICIANS, ARAMÆANS, HEBREWS

Thus, the Phœnicians, or some Semitic people closely related and geographically near them, by 1000 B.C. developed, presumably out of one of the several part-phonetic or syllabic writings in use about or among them, the true alphabet (§ 134). In the two or three centuries following, they established a commercial and maritime supremacy over the Mediterranean that led to the founding of Carthage, direct trade as far as Spain and indirect to Britain, and transmission of the alphabet and other knowledge to the Greeks.

Another trading people, although an inland one, were the Aramæans, Semites of the same wave as the Hebrews but established north of Palestine in Syria, with Damascus as their greatest center. Never more than a secondary political power, they penetrated other countries peacefully, brought in their system of measures and weights, their writing, and even their language. Assyria had become half Aramaic speaking by the time of her fall, and the every-day language of Palestine in the days of Jesus and for some centuries before was Aramaic. Aramæan script, a cursive form of the Phœnician alphabet, gradually replaced Cuneiform writing, first for business and then for official purposes, throughout western Asia and beyond. In the fourteenth century, the Syrian and Palestinian city rulers had written their reports and dispatches to the Egyptian overlord in Cuneiform, which a corps of clerks in the Foreign Office or Dependencies Department at Tell-el-Amarna transcribed into Hieroglyphic or Hieratic. In the fourth century, Persian officials were employing Aramæan for official communications. As the Cuneiform more and more died out, derivatives of Aramæan became the alphabets of Persia; of at least part and possibly the whole of India; of the Jews; of the Arabs; of the Nestorian Christians; and of the ancient Turks, the Mongols, and the Manchus. Practically all Asia except perhaps India, so far as it writes alphabetically, thus derives its letters from an Aramæan source (§ 146).

Equally profound was the influence of the neighboring Hebrews in another phase of civilization. At the time they first entered history, about 1400 B.C., the Hebrews worshiped a tribal god Jahveh. They believed that there were many gods beside him, but that they were his people and he their god. A growing national consciousness led them more and more to emphasize the special relation between him and them, to the exclusion of worship of other deities which was constantly creeping in from their Canaanite, Phœnician, Aramæan, and Egyptian neighbors. Thus they grew into the stage of monolatry, or worship limited to one god. As however Assyria and Babylonia first threatened and then engulfed them, and their national impotence became more and more evident, they confided less in themselves, as they had done in the brief days of their little tenth century glory, and trusted increasingly in their god as their salvation. National hopes fell and divine ones rose; until the Hebrew people passed from thinking of the Lord as all powerful to thinking of him as one and sole: monotheism had evolved out of monolatry as this had grown out of a special tribal cult. Historically the monotheistic idea was not new. Ikhnaton of Egypt had proclaimed it more than half a thousand years before the Hebrew prophets. The concept may actually have been carried over; but it certainly drew sustenance of its own on Hebrew soil and first became established there as a cardinal, enduring element of a national civilization. The Hebrews adhered to monotheism with an ever-increasing insistence; until the concept was taken over by Christianity and Islam—two of the three great international religions; Buddhism, the third, being essentially atheistic. Here then is another tremendously spread cultural element of deep significance that originated as a local west Asiatic variant.

248. Other Contributing Nationalities

Almost every people in the area, in fact, made its special contribution. In Asia Minor evolved the concept of a great primal mother goddess, known to the Greeks as Cybele. Lydia, in western Asia Minor, coined the earliest money about 700 B.C. Some people near the Black Sea in eastern Asia Minor seem to have been the first to develop the working of iron and perhaps of steel. The Kassites from the north or east probably introduced the horse into Babylonia, soon after 2000 B.C.

Thence it spread, as the animal of royalty, aristocracy, and the special arm of chariot warfare, until it reached Egypt some three hundred years later. The first domestication of the horse was apparently in central Asia; the transmission to Europe may have been direct rather than through Mediterranean Asia. The camel had been tamed earlier, also in central Asia. Its remains appear in Turkistan in the copper period; and in Israel the Arab Midianite raiders whom Gideon defeated rode camels, while some generations later, in David's time, about 1000 B.C., horses were still scarce.

249. Ægean Civilization

On the island of Crete, almost equidistant from Asia, Africa, and Europe, there began to grow up with the introduction of bronze, about 3000 B.C., a civilization most of whose elements were imported, but which added to them and molded the whole of its mass with unusual originality. Three great periods, named the Early, Middle, and Late "Minoan" after the legendary Cretan king Minos, are distinguishable in the abundant remains which excavation has brought to light; each of these is divisible into three sub-periods designated I, II, III. At some sites, such as Knossos, the remains of successive sub-periods are separated by layers of packed-down earth deposited when an old settlement was obliterated and serving as floor for the next occupation. Underneath the Bronze Age deposits were thick strata from the Neolithic, with unpainted pottery. With the Early Minoan, about 3000 B.C., painted pottery as well as bronze came in, to be followed by the potter's wheel and a system of hieroglyphic writing unrelated to the Egyptian. In the Middle Minoan the pottery became polychrome, palaces were built, art took a remarkable naturalistic turn in pottery and fresco painting and carving, and the hieroglyphics evolved into a linear, probably syllabic, script. The beginning of the Late Minoan, from the sixteenth to the fourteenth century B.C., saw the culmination of Cretan civilization. Then something violent happened, the palaces were destroyed, and after a brief decadence Minoan culture passed out at the arrival of the first of the historic Greeks, at the opening of the Iron Age, about 1250 B.C.

The Minoans left no chronology of their own and their writing is unread. But datable Egyptian objects found in Cretan strata of identified period, and Cretan objects characteristic of particular periods found at datable Egyptian sites as the result of trade, have made possible an indirect but positive chronology for Minoan culture. The second sub-periods of Early, Middle, and Late Minoan respectively were contemporary with the Sixth, Twelfth, and Eighteenth Dynasties on the Nile. From 2000 B.C. on, Minoan dates are therefore reliable within a century and sometimes less. Industry, commerce, games, a light, practical style of architecture, above all a graceful realistic art, flourished particularly from Middle Minoan III to Late Minoan II. There was evidently considerable wealth, a leisure class, and life was prevailingly peaceful and surrounded with charm.

The Minoans were a Caucasian people of Mediterranean race. Their language is unknown, but seems to have been distinct from the later Greek, and therefore probably non-Indo-European. When their home power crumbled, a fragment appears to have taken refuge in Asia and founded the Philistine cities which for a time pressed the tribal Hebrews and which gave their name to Palestine.

A related culture appears in the ruins of the successive cities of Troy; on the islands of the Ægean Sea; and in mainland Greece, where it has been called Mycenæan, after the citadel and town attributed to Agamemnon. Ægean perhaps is the name least likely to confuse, for this larger culture of which the Cretan Minoan was long the most illustrious representative. The table outlines the principal correlations.

The thirteenth century brought the Greeks, then a rude, hardy, and at first non-maritime people, fighting their way south and wrecking or sapping the Ægean civilization. Culture lost its bloom, life became hard, the outlook contracted. Art shriveled into crude geometric ornamentation, the forms became childishly inept, intercourse with the Orient sank to a minimum, and when trade and foreign stimulation revived they were at first in Phœnician hands. It is not until the seventh century that true history begins in Greece, and in the main only to the sixth that the rudiments of that characteristic Hellenic philosophy, literature, and art can be traced, which were released

	EGYPT	CRETE	GREECE	ASIA
		Geometric Ornament Iron	Dipylon Pottery Geometric Ornament Iron	First Assyrian Empire Philistines
1250	Iron Dynasty XIX, 1350 Amenhotep IV, 1375 Thutmose III, 1501 Dynasty XVIII, 1580	Late Minoan III Destruction of Palaces Late Minoan II Late Minoan I	Late Mycenæan Palaces Domed Tombs Middle Mycenæan Early Mycenæan	Troy, Cities VI, VII Hittites Hebrews enter Palestine Iron Mitanni
1600	Hyksos, 1675 Dynasty XII ends, 1788 Dynasty XII, 2000	New Palaces Linear Script Naturalistic Art Middle Minoan III First Palaces Middle Minoan II Polychrome Pottery Middle Minoan I		Kassites Horse
2000	Dynasty VI Pyramids Dynasties III-V, 2900	Early Minoan III Hieroglyphic Writing Potter's Wheel Early Minoan II Early Minoan I Painted Pottery Bronze	Bronze	Hammurabi Babylon founded Potter's Wheel Cyclopean Walls Troy, City II Bronze Sargon of Akkad Troy, City I (copper)
3000	Low-tin Bronze Dynasties I-II, 3400 Copper	No Stone Structures Incised Pottery Neolithic	Stone Structures Painted Pottery Neolithic	Sumerian Cities Bronze

after the Persian wars early in the fifth century. Yet the half thousand and more years of dark ages between Ægean and classic Greek civilization did not entail a complete interruption. The Greek often enough smote the Mycenæan or Minoan. More often, perhaps, he settled alongside him, possibly oppressed him, but learned from him. He choked out Ægean culture, but nourished his own upon it. The Homeric poems, composed in Greek during this period of retrogression, picture a civilization essentially Ægean; and along with them much other cultural tradition must have been passed on.

At any rate, when Greek culture reëmerged, it was charged with Oriental elements and influences, but perhaps even more charged with Ægean ones. Its games, its unponderous architecture, its open city life, the free quality of its art, its political particularity, its peculiar alert tenseness and feeling for grace, had all flourished before on Greek soil. Their flavor is un-Asiatic and un-Egyptian of whatever period. We have here another instance of the tenacity of the attachment of cultural qualities to the soil; of the faculty, at once absorptive and resistive, that for thousands of years, however inventions might diffuse and culture elements circulate, succeeded in keeping China something that can fairly be called Chinese, India Indian, Egypt Egyptian, the Northwest and Southwest of America Northwestern and Southwestern respectively; in a degree even kept Europe, so long culturally dependent on the Orient, always European.

250. Europe

With Greece we have entered the realm of what is conventionally regarded as history. For the rest of Europe, prehistoric archæology and its record of illiterate peoples abut so closely on history in the ordinary sense, that a tracing of the transition takes one promptly into documentary study. There is much in this early historical field that is of anthropological interest, and just back of it lies more that is specifically so: where the round headed peoples came from who began to appear in Europe during the Neolithic; whether peoples like Ligurians, Sicilians, Scythians, were Indo-Europeans or not, and of what branch;

where the blond Nordic type took shape and whether it originally spoke dialects of the Germanic group; who built Stonehenge and the other megalithic monuments of western Europe; where the first home of the Indo-Europeans lay. But such problems are intricate, and usually answerable, if at all, from stray indications scattered among masses of literary and historical data controllable only by the specialist, whose primary interests tend in other directions. Where these documented indications fail, the problems become speculative. We have no clear record of any indubitable Indo-European people, in or out of Europe, before the second millenium B.C. When they appear in history, they are already differentiated into their familiar main divisions. The Bronze Age Scandinavians seem likely to have been Indo-Europeans and perhaps of the Germanic branch; for the Neolithic an identification would be mere guessing. The LaTène Iron culture is characteristically Keltic, that of the Hallstadt period and area less certainly Illyrian and Keltic. And after all, such considerations concern speech, or race, which can be associated with any culture. Our present concern being primarily with the latter, it will be more profitable to pass on from these questions and turn to regions remote from those in which Occidental civilization assumed its modern form.

251. China

China, far from Europe and known to the outside world only recently, possesses a civilization so different from ours in a multitude of aspects, that thought of connection between the cultures seems at first unreasonable. One thinks of rice, pagodas, bound feet, queues, silk, tea, ancestor worship, a strange, chopped, singing speech, and writing in still stranger characters. Yet the Chinese have long had a civilization identical in many of its constituents with our own: civil government, rimed poetry, painting, trousers, wheat and barley, our common domestic animals, bronze and iron, for instance. Since most of these culture elements are wanting in Africa and Oceania, as well as in native America, there is no inherent reason why they should be expectable in China. Their repetition in China and in the West as the result of independent causes would be remarkable. Evidently many if not all of this group of common traits represent absorptions into the civilization of China, or diffusions out of it into the West, much as the larger part of early European civilization was imported out of the nearer Orient.

In the broader perspective of culture history, then, China no longer stands aloof. The roots of her civilization are largely the same as those of our own. In this light, understanding of Chinese civilization involves two steps. The first is the tracing of the elements derived from the west or imparted to it. The second is the recognition of how these were remodeled and combined with elements of local growth and thereby given their peculiarly Chinese cast and setting.

Authentic historical records of China go back only three thousand years, and her archæology is little known. Beyond the beginning of the Chou dynasty, about 1100 B.C., or more exactly, beyond a point when this dynasty was about three centuries old, in 827 B.C., the Chinese possess only legendary history, in which slight strands of fact are interwoven with fabricated or fabulous constituents. Then, too, the Chinese have long been genuinely more advanced than their neighbors, than all of their world, in fact; with the result that they could hardly escape the conviction of their own superiority and self-sufficiency, and the belief that they had devised almost everything in their own culture. This presumption led to the conscientious manufacture by native historians of dates for inventions which were really made outside of China.

Beginning, then, in the ninth century B.C., we find the Chinese a settled and populous people in the lower valley of the great Yellow river, in what is now the northeastern corner of the "Eighteen Provinces" or China proper, from about Si-an-fu to Peking. They may have come from middle Asia or still farther west by a national migration, as has sometimes been conjectured: there is nothing to show that they did, and a great deal to suggest that they had lived in or near their seats of that period long before. It is difficult to imagine that the Chinese could have moved out of central Asia without leaving a part of their number behind, or without leaving conspicuous traces of their culture among their former neighbors. Of this there is no evidence. For one of the most advanced peoples of its time to remove itself and its civilization complete and unimpaired would be without parallel in history, and indeed is inconceivable as soon as one turns from the vague idea to face specific details of the process.

Nevertheless the Chinese as we first know them had the principal grains and tamed animals, the metals and plow and wheel of contemporary Eastern Asia and Europe. While it is scarcely thinkable that this great complex of culture traits should not have been due to connections with the west, there is every probability that these connections were of the sort that have been traced so frequently in foregoing pages: diffusions unaccompanied by populational drifts, or at least in the main independent of them. When it is recalled that western Turkistan held cereal-growing and animal-raising inhabitants far back in the Neolithic, and that the Bronze period is definitely represented in Siberia,[1] such transmission will not seem far fetched. It is also well to remember that all through the historic period central Asia contained farming populations, cities, traders, and skilled artisans, some measure of which evidences of higher culture it is only necessary to project a few thousand years backward to complete the link in the cultural chain between China and the west. We tend to overlook this fact because it is the transient Hun and Mongol invasions that chiefly obtrude into both western and Chinese history. Whenever the nomads ceased boiling over, they receded from the historians' view. Obviously they could not have migrated and fought and burnt and slain among each other continuously. The more settled life at home, which they led most of the time, and into which they were always inclined to take over the religion, writing, and arts of the Orient, India and China, is the phase of their existence most likely to be overlooked, but which, from the point of view of the history of civilization, is far more important than their evanescent conquests. In this underlying phase they were the connectors of Near and Far East.

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[1] A Uralic Bronze Age culture-area is recognizable as stretching with considerable uniformity from the Dniepr in southwestern Russia to Lake Baikal in the latitude of eastern Mongolia, and centering about Minusinsk on the upper Yenisei. It possessed horse trappings, an abundance of sickles that argue a population primarily agricultural, and socketed axes related to the type that occurred in western Europe between about 1400 and 1000 B.C. This bronze culture shows definite resemblances on the one hand to that of the Danubian area—and, it may be added, of the Caucasus; on the other, to the ancient bronzes of China.

It is interesting in this connection that so far as more recent transmissions between China and the west are datable or positively traceable, they took place chiefly by the long land route through central Asia. The first trade between the Roman empire and China of the Han dynasty was overland; so was the introduction of Buddhism and cotton from India. In each case sea communication came later. It was scarcely before Mohammedan times that ocean trade between China and the west became important.

On the other hand, the Chinese and other east Asiatics always lacked, and still lack, several aspects of the grain-cattle-horse-wheel-metals cluster that are very ancient and practically universal in Europe, the Near East, and even central Asia. They do not use milk or its products, wool, nor bread-leaven. It has been suggested that the cluster was transmitted to China before these traits had been added to it; and that when they finally might have reached China, they found its people satisfactorily established in a culture containing substitutes for these traits, and therefore resistive to them.

It is significant that even to-day northern China, within which the oldest known China lay, still cultivates wheat, barley, and millet, and breeds cattle, horses, sheep, goats, and swine, as did the Swiss lake-dwellers; whereas in southern China the typical grain and animal are rice and the buffalo, as in Indo-China and Malaysia. There are evidently two fundamentally distinct economic systems here, characteristic respectively of Europe and west and north Asia, and of southeastern Asia; and evolving in the main independently. The first civilized China, that of the Chou period, that which produced Confucius as its literary standardizer, and has chiefly shaped Chinese traditions and institutions ever since, belonged to the great northern and western cycle; was in fact its easternmost outpost.

This brings up the question whether Chinese writing could not also have sprung from a western source, notably the Sumerian Cuneiform, which it superficially resembles in its linear, non-pictorial strokes, and in its mixed ideographic-phonetic method. The connection has indeed been asserted, but no satisfactory evidence of specific correspondences has been adduced. The most that it seems valid to maintain is that a remote connection is thinkable; a connection not extending beyond a limited number of characters or the idea or method of writing. The earliest Chinese characters preserved on bronzes are nearly two thousand years younger than the most ancient inscriptions of the system which developed into the classic Cuneiform. Both systems are fairly crystallized when they first come to our knowledge. Their formative stages, in which such connection as they might have would be most apparent, are obscure. It is well to remember that Cuneiform and Egyptian hieroglyphic, which were virtually contemporaneous and much nearer to each other geographically, have not yet been brought into specific relation as regards their origins.

252. Growth and Spread of Chinese Civilization

Chou China at first embraced most of Shensi and Honan, southern Shansi and Chihli, and western Shantung. It was feudal, and practically as separatist as mediæval Germany. The chief functions of the over-king were to perform sacrifices, to admonish the kings and princes, and to govern his small dynastic domain. Unity lay not so much in an effective organization as in an idea, the feeling of a common race and especially of a common civilization. This idea has persisted to the present. It is adhesion to the culture of China, to its deep roots, its permanence, its humanities, that has always made Chinamen feel themselves Chinamen; has in fact sooner or later turned into Chinamen all alien elements, whether they were intrusive conquerors or primitive folk, that came to be included within the limits of the realm. In this way common customs and ideals already united the dozen or more larger Chou states and hundreds of dependencies; and chronic internal warfare did not prevent this era from being the age of Confucius, Laotse, Mencius and the other great sages that from the sixth to the fourth centuries formulated the typical Chinese character and attitude.

During the latter part of the Chou period began a gradual reduction of the number of feudal states, due to the larger swallowing the smaller. By the middle of the third century, two of these had emerged as preponderant: Ts'in in the west, centering about the Wei valley, and Ch'u on the south, along the middle Yangtse. Both were frontier states, less cultivated and hardier than the others, and regarded as barbarian or only half Chinese. Ts'in may have included some Hunnish absorptions; Ch'u very likely represented the rule of a Chinese dynasty over a native population whose original affiliations may have been either with the non-Sinitic Anamese of to-day, with the Shan-Siamese division, or with some closer branch of the Sinitic family, but who were gradually assimilating the culture and speech of the northern old China. At last, in 223 B.C., Ch'u fell before Ts'in, and within two years the remaining states in the northeast collapsed. For the first time China, from nearly its present frontier to south of the Yangtse, was effectively under one active ruler, Shi Hwang-ti, the "first emperor." His dynasty crumbled almost at his death, but only to be succeeded by the famous Han line, under which, in the two centuries before and the two after Christ, China extended, consolidated, and prospered. The boundaries of the empire were pushed, in name at least, to virtually their present limits; and though political control may often have been slight, cultural influence progressed rapidly south of the Yangtse, much as Gaul became Romanized at the same time. Even the survival of half-independent barbarian groups here and there in the south and west has its parallel in the persistence of Keltic speech in French Brittany. By the seventh to ninth centuries after Christ, when the empire flourished once more under the Tang dynasty, the mass of southern China may be considered to have been substantially assimilated. Even the southern coast, which was the last area to be integrated, and which retains to-day the greatest dialectic differentiations and autonomous tendencies, had become part of the Chinese polity and civilization. The consequence was that when in the thirteenth century the Mongols and in the seventeenth the Manchus conquered the empire, they accomplished little more than the overthrow of one dynasty by another. The course of Chinese culture went on undisturbed, as it had in several previous historic periods when half of the realm passed temporarily under the sway of nomads or barbarians from the north.

A considerable measure of the cultural predominance of China over her neighbors is to be ascribed to her more numerous population, which in turn was partly due to the cultural advance. The Chinese were the first nation to maintain a system of fairly reliable census records. In the first century and a half after Christ, under the Hans, ten censuses showed from 29 to 83 million inhabitants, the average being 63 millions, or about the same as the estimated population of the Roman empire at its height; somewhat more than that of Europe when America was discovered. A thousand years later, between 1021 and 1580, eight censuses yielded from 43 to 100 millions, with an average of 62 millions. Under the Manchus the population gradually rose from 125 millions in 1736 to 380 in 1881. To-day, the northern half of China is about twice as populous as the southern, and the eastern half exceeds the western in the same ratio. This superior density of population in the northeast reflects the fact that ancient China was the northeast. The same grounding in the past is evident in the fact that from the time of the Chous until the Mongol conquest in 1268, the imperial capitals lay mainly in Shensi or Honan, the core of the old kingdom.

Many ingredients of modern Chinese civilization, and most of its distinctive color, have been present in it since the opening of the historic period. Such are the use of hemp and silk as the typical textile materials; of jade as the precious stone of the nation; the tremendous, life-long moral authority accorded to parents, and the associated worship of ancestors; the unusual respect and rewards for learning; a professed contempt for war and emotional activity; aversion for mythological and metaphysical, scientific, or any other sort of speculation, and coupled therewith an unflagging interest in practical ethics, in the cultivation of character, in the finer shaping of the relations of individuals. These and other leanings endow Chinese civilization with something persistently idiomatic, with a quality of coherent originality. If this civilization were less great, China and the countries influenced by it would be spoken of as constituting what among barbarous and savage peoples we call a culture-area. In the widest perspective, they are such. China, India, the West—which in this view of course includes the Near East as well as Europe—are the three great focal centers of civilization in the eastern hemisphere. Their cultures have risen far above those of the intervening and peripheral nations. Until quite recent centuries, the three have run their courses with approximately equal achievement. And while exchanging elements since prehistoric times, they have each molded both what they borrowed and what they devised into a unified and distinctive design, have stamped it with original patterns. In short, culture development in China, India, and the Occident has been coördinate.

Of course, this distinctness of the three great regions of Old World civilization does not imply that diffusion of culture elements between them ever ceased. It is the form more than the content of civilization that is peculiar to the three areas. From India, for instance, China derived Buddhism, which was accorded a reception under the Hans and cultivated with fervor in the following centuries. Cotton came in the wake of the religion—first as a rare and valuable textile, then to be grown. The West, within the historic period, gave glass and perhaps the impulse toward a Chinese ''invention''—porcelain, a glazed-through pottery. In recent centuries the West acted as transmitter for several elements of American origin, tobacco, for example, and maize, which quickly became an important food-plant in parts of China. There have even been reimportations. Gunpowder is said to have been used for fireworks in China in the fifth century, for war in the twelfth, but its employment for the propulsion of missiles from firearms is due to introduction by the Altaic nations in the fifteenth century. From the fourth century B.C. on, there are repeated references in Chinese sources to the magnetic needle and to ''south-pointing chariots''—apparently a compass-like device used on land, though probably only as a mechanical toy. Then the needle was applied to geomantic purposes, until Arab or other foreign sailors took it up as a true mariner's compass, and in the eleventh or twelfth century reintroduced it to the Chinese as an instrument of navigation.

Nor was civilization as stagnant in China as the outsider is likely to think, who becomes aware first of all of its persistent native flavor. The old war chariot, for instance, went out of use about contemporaneously in China and the West. Printing from engraved blocks was in vogue in the sixth century after Christ, from movable clay types in the dynasties between the Tangs and the Mongols, from metal types not much later, since the art was established among the imitating Koreans in the fifteenth century. A system of classifying the numerous characters was invented before the Tangs; the modern one of grouping them according to 214 radicals, under the Mings. True encyclopædias were first compiled in the fourteenth century—four hundred years earlier than in the West. The system of awarding office on the basis of literary examinations took root under the Hans and became organized under the Tangs. The earliest poetry, three thousand years ago, was rimed, and had four or five monosyllabic words in the line. In the Tang time, the line became extended to seven words; and still later was the origin of the peculiar rhythm of alternating tones—a system by which every other word was one bearing the ''even'' tone and those between any of the other tones. Paper making is said to date from the Hans, and paper money was first issued—disastrously as in some of the first Western attempts—under the Mongols. These and dozens of other instances that might be compiled exemplify, as does the history of ancient Egypt, that even those cultures constantly move to which one is tempted to apply the stigma ''conservative'' or ''tradition-bound.''

253. The Lolos

Scattered in the mountains of southern and western China are a number of barbarous, semi-independent peoples of distinctive ways and speech who maintain their national or tribal status. They seem on first contact to promise a picture of the pre-Chinese culture of the area, but examination shows their customs to be a blend of primitive and advanced, ancient and recent elements. The Lolos of Szechuan may serve as an example. They eat meat from their herds, use no milk, but wear woolen clothing. They grow neither cotton nor rice. They raise oats, buckwheat, maize, and potatoes. Two of these plants are of north or west Asiatic origin; the others are

American. Plows are used. Houses are of lashed bamboos, and rain-coats of palm-fiber. No pottery is made, but iron is worked into weapons and tools by native smiths. The Lolos are warlike. They fight like Malaysians with lance and sword. They are organized ''feudally,'' into nobility and commoners, with tribal heads or lords. They marry cousins. Religion resembles that of the more backward Indo-Chinese and Malaysian peoples. Sorcerer-priests cure disease; sacrifice animals for their blood, the flesh being eaten; offer also fermented liquor; divine the future by observing parts of the sacrificed animals—the cracks that develop in heated shoulder-blades (§ 97). There is a native system of writing, which seems to derive from Chinese stimulus, if not sources. It is obvious that this culture has fused together very old elements that are characteristic of southeastern Asia, with elements that have flowed in from remote sources or during the most recent centuries. It is also clear that certain ingredients of Chinese culture have been freely absorbed and others rejected by this mountain people.

Such cultures as that of the Lolos may be described as internally marginal or peripheral. They differ from externally marginal cultures, like those of the Bushmen, Australians, Fuegians, in that the latter, on account of their geographical remoteness, have retained their ancient level with relative purity. Included marginal cultures, on the contrary, being of necessity exposed to subsequent influences, are regularly a mixture of belated and recent ingredients, no matter how well integrated these may have become.

254. Korea

Korea has repeatedly been under the political authority of China, more often autonomous, but for three thousand years has been dependent on China culturally. Non-Chinese influences have also reached it: such as an alphabet of Indian origin (§ 149); and probably the earliest iron industry came in from Altaic sources. In its turn, the peninsula transmitted to Japan: until about a thousand years ago, Chinese writing and culture reached Japan mainly via Korea. The spread of Chinese civilization was perhaps largely of the usual, slow, diffusing kind, but was several times accelerated by the settlement in Korea of groups of Chinese refugees, colonists, or adventurers; for instance in Chou and Han times. The center of power and civilization within Korea has gradually moved southwards, which suggests the waning of original central Asiatic affiliations as Chinese ones became stronger. The first realm to be defined was Fuyu on the Sungari river. Then followed Kokorai or Korai, whence our name Korea. In the centuries immediately before and after Christ, Shinra and then Hiaksai, farther south on the peninsula, came into the lead. By the beginning of this period not only the writing but the classic books of China had been introduced. Since the fourteenth century Confucianism has been the state religion—though the people had long before become Buddhists—and literary examinations for office of the Chinese type have been in vogue.

255. JAPAN

Japan is the one country of eastern Asia from which considerable prehistoric data are available. There are indeed no indubitable evidences of any Palæolithic culture or race, but shell-heaps and burial mounds abound and have been explored. The shell deposits, of which 4,000 have been found, are probably the accumulation of refuse of occupation by the Ainu, the first known inhabitants of Japan, now surviving only in the extreme north of the island chain and in Sakhalien, and still a primitive people. This race is different from the Japanese, and has often been classified as Caucasian (§ 27) The shell deposits show the aborigines to have been fishers and hunters, without agriculture or edible domestic animals. They had the bow, dog, incised hand-made pottery, and ground stone axes, and were thus approximately in an early Neolithic stage.

A somewhat dubious bronze age is sparsely represented in southern Japan. It has been ascribed to an invasion about the seventh century B.C., but is perhaps only an early phase of the iron age. Iron was brought in at a time not precisely determined, but likely to have been about the fourth century B.C., by the so-called Yamato people—evidently the ancestors of the Japanese of to-day—who seem to have come from Korea and at any rate occupied the southern islands first. Thence they fought their way northward, gaining territory at the expense of the natives but slowly. Fifteen centuries ago the northern third of the main island was still in Ainu possession. These early Japanese erected megalithic chambers or corridors as tombs for their princes, covering them with mounds of earth. More than 3,000 of these structures are known. The early emperors were buried in double mounds, some of them of great area. From the fifth to the seventh century Korean influence was strong; the Chinese writing and classics were imported from that country. Later relations between the two nations were more intermittent, perhaps because of the growing consolidation and strength of Japan from the eighth century on.

The cultural debt of Japan to China is great, but less than that of Korea. The Japanese added 47 purely phonetic syllabic characters to the Chinese writing, in order to represent their own proper names, grammatical forms, and the like. These characters would have sufficed for a simple, efficient, and purely native script, but have remained a mere supplement to the ideographic Chinese system (§ 105). The mandarin and examination system of China were never taken over by the Japanese, who clung to their feudal customs more than two thousand years later than China. The ancestor worship of the Chinese and the official Confucian religion also did not become established in Japan, the state cult being Shinto, the crystallization of a primitive set of rites and of a mythology which has parallels in the Occident, in the East Indies and Oceania, and even in North America, rather than in China.

An early Malaysian strain in both Japanese race and culture has been alleged, but this is a subject on which more evidence is needed. Japanese speech does not elucidate the origins of the nation, the language—like that of Korea—not being determined as related to any other. The physical type, on the other hand, and this applies also to Korea, is allied to that of China.

256. Central and Northern Asia

It has become a habit to regard central and northern Asia as a hive for humanity, as the area from which nations and races have chronically swarmed. Whenever the origin of a people remains obscure, be they Neandertals, Alpines, Sumerians, Chinese, Japanese, Aryans, or what not, some one propounds the convenient hypothesis of deriving them from this vast interior land, which in many cases amounts to an explanation of the half-known by the unknown. Of late there has been added the fashion of attributing the expansions to climatic drying-up of central Asia, which forced the population out. There appears to be considerable evidence of such progressive desiccation; but its degree, and still more the extent of its influence upon culture and emigration, remain to be ascertained.

A more balanced view would concede the recurrence and occasional destructiveness of the invasions out of central Asia, but would view them rather as transient and relatively superficial phenomena from the point of view of civilization; and on the other hand would recognize that under all the boiling of tribes and peoples, the growth and spread of culture went steadily on, even in the tracts which one is wont to associate only with the perpetual breeding of elusive and devastating nomads. In short, it is wise to guard against a natural overestimation of the sensational, cataclysmic aspects of the history of the interior Asiatic peoples. It is their spasmodic irruptions which the self-centered nations of the West, of India, and of China, have been chiefly concerned with. Their attempts at achieving stability, their increments to the world's culture, their rôle as peaceful transmitters, have lain at home, largely out of vision of the peoples clustered about the foci of civilization.

It may be added that the temptation to the outsider to burst by force into the seats of wealth and splendor as soon as firmness of guard slackens, is not confined to Ural-Altaians, but is ever present in history. Amorites, Hebrews, Arabs, Æthiopians, Lybians, Greeks, Kelts, Germans, Hindus, and Malays have all played this part at one time or another. Semite, Hamite, and Aryan are no different in such regard from Ural-Altaian, except that in the short span conventionally known as history the former have happened more often to be the ins and haves, the central Asiatics the outs and have-nots. Further, the destructive effect of nomad migrations, even where accompanied by mass settlement of population, is everywhere transient so far as civilization is concerned. Hebrew and Hellenic, Arab and Germanic tribes did crash cities and empires before them, but they tore down only what was already moribund, and brought in new systems of thought, new methods of feeling and organization, which, however crude at first, soon added new qualities to culture. The chief distinction of the north Asiatics is that, excepting some terror-striking massacres, they were both less subversive and less constructive culturally than Semites and Indo-Europeans. They barely dented the civilization of the West as they barely dented that of India and China. If Russia is backward as compared with western Europe, it is not from having been Tatar-ruled a few centuries, but because Russia has long been peripheral to the Mediterranean focus of civilization and therefore chronically belated. It was the very thinness of her culture that made mediæval Russia succumb to the Mongol wave which pounded vainly against the more consolidated civilization of central Europe and quickly drew off.

To define the exact contribution of the North Asiatics to civilization is difficult: partly because of the comparative paucity of available archæological and historical records; partly because their habitat did not contain one of the greater hearths of civilization at which its most distinctive forms were sweated out. The area has always been relatively though not extremely peripheral. The horse, indeed, can be set down as one important gift of the Ural-Altaic peoples or their predecessors to general civilization. It is only in central Asia that a wild horse —not a tame breed that has run wild—is to be found; and it seems to have been from the north that soon after 2000 B.C. the animal was introduced into Mesopotamia and India. Biological considerations also point to interior Asia as the most likely area of first domestication of several of the earlier fundamental animals of culture, especially the sheep and goat. The comparatively advanced culture of Anau in Turkistan in the Neolithic and early Bronze periods is also significant, even though this site lies only just within the great steppe and plateau country. Some of the jade and jade-like stone used for tools and ornaments in the Swiss lake-dwellings appears to have come from inner Turkistan. The probability of the central Asiatic peoples having been the transmitters of metals, cattle, grains and other important groups of culture elements from the Near to the Far East has already been mentioned, as has the established trade between China and the Mediterranean world in Roman times (§ 251). Indeed the very character of the country and cultural conditions which favored a considerable degree, though not an absolute prevalence, of nomadism in interior Asia, seem also to have fostered, in many periods, a longer range of trade than flourished elsewhere. Finally, it appears that the Turks and Mongols had at least a hand in the early use of gunpowder for firearms; and, as already mentioned, the first state paper money, that of China, was issued by a Mongol dynasty. It is scarcely rash to predict that the intensive study of the interior Asiatic peoples from both prehistoric and historic sources, without speculative bias or plunging of opinion, will prove one of the most illuminating contributions to the history of general civilization.

The original unity of the Ural-Altaians—with the Turks, Mongols, and Tungus-Manchu as the Altaic or definitely Asiatic group, Finno-Ugrians as Uralic or Eurasian, and Samoyeds as specifically Arctic representatives—is accepted on linguistic grounds by almost all authorities in the field. Yet the career of the several divisions has been diverse. The Finno-Ugrians have mainly been peaceful: the Finns definitely so for two thousand years: the Hungarian Magyars were exceptional when they terrorized central Europe a thousand years ago. Both these nations have long since become integrally absorbed into European culture. They are the only Ural-Altaic peoples with this experience. The remainder of the Finno-Ugrians have for some centuries become increasingly submerged under Russian civilization; much as in the Far East the Manchu-Tungus have gradually fallen more and more under either Chinese or, of late, Russian cultural influence. As between the Turks and Mongols, the greatest single conquest, that of Djengis Khan and his successors, falls to the record of the latter; but the Turks have been the more numerous, stable, and advanced people. They have frequently settled as well as invaded; and are the only known stock, as previously mentioned (§ 245), that has ever seriously and permanently encroached on territory once held by Indo-Europeans—in Asia Minor and the

Caspian region. The later so-called Mongol conquests, those of Tamerlane and the Indian Moguls, were made by armies mainly of Turks under dynasties tracing back to former Mongol leaders. The Turks in general have inclined to Mohammedanism on coming into contact with the world religions, the Mongols to Buddhism, although Christianity in its Nestorian form once made considerable numbers of converts among both.

Several important historic peoples cannot yet be assigned with certainty to one or the other of the Ural-Altaic divisions, or are variously classified: thus the Huns, most likely to have been Turks; the White Huns or Ephthalites; the Avars; and the ancient Bulgars.

In northern and eastern Siberia there live, besides the Samoyed, a series of non-Ural-Altaic peoples, truly peripheral and retarded in culture, who seem once to have occupied larger areas but to have shrunk or been partially absorbed before Ural-Altaic expansion. These include the tribes sometimes grouped as Yeniseian; the Yukaghir; the Kamchadal-Koryak-Chukchi group; a few Eskimo who have either failed to cross Behring strait or have come across it from America; and perhaps the Ainu of Japan and Sakhalien. These have been called the Palæo-Asiatic peoples, though their diverse languages render their community of origin dubious. How far they may be considered as following a positively similar culture, except in direct response to an extreme climate, is also doubtful. Their rigorously marginal position and depriving environment stamp their culture with a preponderance of negative traits. The possession of domesticated reindeer is common to several of these peoples as well as to the Tungus and the Finno-Ugric Lapps of northern Russia and Scandinavia. Reindeer-breeding among these groups appears to be due to a transmission, in the sense of being a reflex of contact, an imitation of the cattle or horse breeding of the more favorably situated nations to the south. It is also interesting and probably significant that the American Eskimos never domesticated the reindeer, although they depended largely upon its hunt.

Racially the array of north and central Asiatic peoples shades from pronounced Caucasian to extreme Mongoloid type. The Mongols have given name to their whole larger racial stock, and the Tungus-Manchu and northeast Siberian savages clearly form part thereof. The Turks in the main are rather Caucasian, although all intergradations occur according to region; as also among the Finno-Ugrians. The Hungarians to-day are not only Caucasians but Alpines; the Finns definite Nordics; the Lapps a strange partial graft of Nordic traits on broad faced and broad headed Mongolian physique.

257. INDIA

India is not a country, but a connected block of lands shut off from the remainder of the world by lofty mountains and harboring a population approximating those of Europe and of China. Its 300,000,000 inhabitants constitute nearly a fifth of humanity. Historically, India forms a continent as fully as does Africa. Culturally, it must be equated with the Occidental or Mediterranean area and with China as one of the three great and substantially coördinate focal points which civilization developed in the eastern hemisphere.

Racially the peoples of India are prevailingly Caucasian, but both the two other great stocks are represented. Nearly everywhere, but especially in the south, there is an evident admixture of a dark skinned, broad nosed, long headed type. This is more likely to have had Australoid than Negro affinities before its absorption; remnants of it, like the Veddas of Ceylon and Irulas and some other tribes of the Deccan, are often grouped with more easterly peoples as representatives of an original Indo-Australoid race (§ 24, 27, 260). So far as this race can be reconstructed, it seems to have been less Negroid than the Australian of to-day; that is, it possessed more Caucasian resemblances. In fact, it might almost be described as proto-Caucasian. In this light the modern Hindu[1] would be a varying mixture of two related strains—the undifferentiated proto-Caucasian, approximating the Australian and perhaps having ultimate Negroid relations without being Negroid; and the specialized Caucasian typical of the Occident; the former strongest in the south, the latter almost pure in the northwest of India. This hypothesis has this to commend it: it squares with the facts that the Hindu in spite of his dark complexion makes almost universally the impression of being essentially "white" in race; and that he differs outstandingly from what a mulatto-like blend of Negro and Caucasian would be.

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[1] In India, "Hindu" means any native who adheres to the higher cults of native origin which collectively constitute the "religion" known as Hinduism; in effect, the non-savage and non-Mohammedan inhabitants. Hindus and Mohammedans are contrasted in local usage. In this book, Hindu is synonymous with Indian, irrespective of religion.

In the north and east of India, Mongolian resemblances begin to appear, as the natural result of thousands of years of contact of two stocks.

It would seem that the proportions of racial blood in India, and in the rough their geographical distribution, parallel the proportions of the numbers of speakers of tongues belonging to the several families. More than three-fourths of the Hindus speak Indo-European dialects. Most of the remainder are Dravidas in the south and Kolarians in the east central parts—the same regions in which the Indo-Australoid or proto-Caucasian element is most conspicuous. Along the northeastern edge, Tibeto-Burman speech has spilled in with the Mongolian type. However, while the races have blended, the languages have remained distinct. As almost everywhere, the linguistic classification is therefore clearer cut in India than the racial one. Consequently it is misleading to infer from a Hindu's speaking a Sanskrit-derived language that his Caucasian blood is pure, or conversely to conclude that all Dravidians have broad noses and black skins.

The Kolarians have been thought by some to possess ancient linguistic relatives to the east (§ 50), and certainly possess cultural ones in this direction (§ 262). Dravidian speech has not been thus connected, except tentatively, and one indication points to its former westward extension: the Brahui language in Beluchistan, which appears to be the remnant of an old Dravidian offshoot.

The ancient culture of India is inadequately known. Archæological exploration and analysis have been insufficient; yet they have gone far enough to suggest that the prehistoric development followed different lines from those in the West, so that the findings of European prehistory cannot be applied to interpret such knowledge as there is on India. Thus the Lower

Palæolithic stage is well represented in India, but there is nothing to show whether or not it was contemporaneous with that of Europe. There is some possibility that it passed into the Neolithic without the intervening Upper Palæolithic which is so important in western Europe (§ 213). It seems dubious whether there was a true Bronze Age in India. More pre-iron implements of pure copper seem to have been found than of tin bronze.

The early Kolarian culture seems preserved in considerable degree among the modern Kolarians, who are backward hill or forest tribes, that is, internally peripheral to the prevalent higher civilization. At any rate, their culture resembles that of many less advanced populations to the east, well out into Oceania. This presumably ancient and partly surviving "Indo-Oceanic" culture is discussed below (§ 262). As regards its history within India, this is almost certain: the old culture is nowhere any longer pure, but has regularly absorbed elements of the advanced civilization that surrounds it; and conversely has contributed to the latter. For instance, one of the great recognized cults of India is Sivaism, which tends frequently to bloodiness and obscenity and is a strange mixture of philosophical rationalization and crass superstition. One of the most frequent attributes of Siva is a necklace of skulls; a feature that looks as if it might go back to the skull cult which is a typical ingredient of Indo-Oceanic culture.

The old Dravidian culture was probably more advanced than the Kolarian but is more difficult to reconstruct because of its extensive blending with the culture brought in or developed by Indo-Europeans. The Dravidians, perhaps because they were the more advanced and populous, were able to accept the intrusive culture and yet maintain themselves, whereas the Kolarians either preserved themselves by resisting civilization or had their speech and identity absorbed by it. When the Dravidians first begin to creep into history, shortly before the Christian era, they already possess cities, kingdoms, commerce, writing, and philosophy. They have on the whole contributed less to Indian civilization than the Indo-Europeans: its center always lay in the north; but they have long formed an integral part of it.

The Indo-Europeans are first known to us from their religious hymns, the Vedas, which have been preserved as sacrosanct by succeeding ages, and constitute the oldest continuously transmitted documents in history. They date from 2000 or 1500 to not after 1000 B.C., and are in Sanskrit, which is fairly close to Avestan or Old Persian, the two languages and their descendants constituting the Indo-Iranian or proper Aryan branch of Indo-European. When Indo-European as a whole is designated as Aryan, it is by an extension of the term. The region of India to which the Vedas almost wholly refer is the Indus drainage, that is the northwest, the parts adjoining the Iranian highland, whence the invaders came or through which they passed.

Vedic Aryan culture was of late Bronze Age type. Whether the bronze was really such, or copper, it is mentioned more frequently than iron, as in Homer and the older books of the Bible. Grains, cattle, horses, chariots and wagons, the plow, wool and weaving, gold, patriarchal chieftains and a tribal society, a nature mythology, non-communal rituals with constant but prevailingly bloodless sacrifices, are the characteristics of this culture. It smacks more of the Europe of its time than of the contemporary Orient. It is unbound, ready to pack up and move without being essentially nomadic; half peasant-like and half aristocratic; an uncitified semi-civilization, pioneer rather than backwoods. The temples and writing, walled towns and kingdoms, district gods and royal tombs of Egypt, Babylon, Canaan, Minoan Greece are wanting. The picture is that of the first historic Indo-Europeans elsewhere, in eastern and central Europe; with whom the Aryans undoubtedly were or had been in connection through the countries north of the Black and Caspian seas.

A few centuries after the Vedas, the culture depicted by the literary remains is profoundly altered. The scene has shifted to the Ganges valley. There are cities and palaces, wealth and pomp. There are kings, priests, townsmen, peasants, hermits and ascetics. Caste is in vogue. Cotton and rice are in use. There is a deal of philosophizing; life appears complex and difficult; pessimism is abroad, soul rebirth taken for granted, spirituality emphasized. Concepts to which western science later returned, the atom and ether, are familiar. In all essentials, post-Christian Hinduism had been blocked out in this pre-Christian period. Only a few elements like money and writing are lacking.

This change from the Vedic age is not fully accounted for, and the time usually allowed for its occurrence is insufficient. Buddha was born B.C. 563 or 557. His religion assumes ideas which are part of the Sankhya philosophy—in many ways the subtlest philosophy of all India and one of the great thought systematizations of the world. Its founder Kapila is placed about 600 B.C., and must have had predecessors. Caste seems a thing of development. It is absent in the Vedas, but Buddhism is already in a measure a protest against it. It seems difficult to squeeze such growths into a few hundred years. It is true that the florescence of Greece came with a rush; but Greek civilization rose from the debris of the older Minoan one and was in contact with the cultures of Asia. In India there is no sign of an antecedent high civilization, and a greater dearth of known foreign influences between 1000 and 600 B.C. than at any other period. The transposition of the cultural center eastward must enter into the problem. Perhaps a larger and wealthier pre-Aryan population was encountered by the Aryans along the Ganges, contact and mixture with whom proved provocative of innovation. Or possibly the movement and development in the east began while the Vedas were still being composed along the Indus, and were ignored by them. Or, conceivably, the Aryans on the Ganges may have been the first comers, who quickly altered in the direction of their future civilization but remained obscure to our vision during the period in which the Vedas were being made or retained by the later comers of the Punjab, in whose memories and sub-arid environment their former steppe culture remained more unmodified. These are only speculations: they emphasize the gap in our understanding of this important chapter of world culture history.

258. Indian Caste and Religion

Caste is peculiarly Indian. Nowhere else is it so complex, so systematically worked out and endlessly reinforced by ritual and taboo, so pervasive of conduct and thought. It has been ascribed to the conflict of races, to the drawing of a color line by conquerors in order to keep their lineage and culture pure. If so, it has failed egregiously, as the physical anthropology of modern India shows. The explanation is obviously inadequate. Castes do represent race to a certain extent, but they also represent nationalities, tribes, common residence, religious distinctness, occupations, cultural status. Whatever sets off a group in any way may be sufficient to make it a caste in India. If groups diverge within an established caste, they become recognized as sub-castes, perhaps finally to develop into wholly separate castes. Priests, nobles, clerks, fishermen, street-sweepers are castes; so are the Parsis; so are hill tribes that maintain their primitive customs—the Dravidian Todas for instance are reckoned a high caste. Clearly we have here a generic system, a pattern of organizing society, into which every sort of group as it actually forms is fitted. Caste is a way of thought which the Hindu has tried to universalize.

All Indian castes are in theory strictly endogamous: intermarriage is intolerable. All possess an intrinsic, unchangeable worth. Thus they automatically rank themselves. Each possesses an occupation, a mode of life and customs, a set of prescribed rituals, inherently peculiar to it. The greater the restrictions and prohibitions incumbent upon it, the less it relaxes to comfort and indifference. and the more spiritual it is, the higher its grade. In consequence it is also the more pollutable, and so its restrictions are drawn the closer The wider the gap of non-intercourse, of non-contact with lower castes, the greater becomes its purity. Caste observance is thus a virtue, an aid to religion and morality; breaking caste an ultimate indecency; the offspring of inter-caste unions necessarily lower than either parent, and their descendants, unless from matings with their own miserable kind, lower still, in an infinitely descending series. There is no elevating a caste. The very attempt to rise is a vice that brings degradation as a result. since castes are eternal, founded in nature, absolute, so that alteration is of necessity a sullying.

Such is the Hindu scheme—which in actuality is lived up to in no single point. Perverse as the system seems to men reared in other cultures, it must be admitted to possess completeness, self-consistency, and the desire to preserve inward worth. It differs from the basic assumptions of our civilization in that it sees value as something already existing and therefore to be maintained, not to be created; it tries to fit life into a theoretical pattern; it is futureless. Yet all the facts show that as historical realities castes have changed enormously and are changing now. Obviously therefore each generation ignores the changes last made and repeats its insistence on caste perpetuity and unalterability. Such is the hold of patterns on men's minds.

The theorizing which the Hindu does about caste is characteristic of him in all cultural manifestations. The relation which can be thought out between one fact or act and others, the compartment to which it can be assigned in a system, are of more interest to him, as compared with the fact itself, than to peoples of other civilizations. Hence philosophy has flourished in India, but native history has been inadequate and disorderly. Hence too the abstract sciences of logic, mathematics, grammar enjoyed an early original development, equal for a long time and in part antecedent to that which they attained in the West. On the other hand the astronomical and still more the physical and biological sciences remained backward: they were concerned with concrete objects. The Hindus seem never to have made a move of their own toward devising a system of writing; but once the Semitic alphabet had been introduced, they modified, expanded, and rearranged it into a more logical scheme, a more consistent one phonetically, than any other people has given it (§ 146). It is probably no accident that chess and our "Arabic" position numerals with a symbol for zero (§ 109) are Hindu inventions, and that it is only in India that priests have for age after age been ranked higher than rulers.

It is natural that a culture of such inclinations should exalt the mind and soul above the body. Hence the extraordinary development of asceticism in Indian religion; its deep pessimism as regards life on this earth; its insistence on the superior reality of soul, with which is connected the universal assumption of rebirths; the working out of a system of unescapable moral causality called *karma* in place of a scheme of mechanical causation; the tendencies toward pantheistic identification of soul and God, or atheistic denial of divinity as distinct from soul; and the thoroughly anti-materialistic bent of almost all Hindu philosophy. It is also intelligible that these qualities should have imparted to Indian religion a superior degree of spiritual intensity which was appreciated by the nations to the north and east when Buddhism was presented to them, and caused them to embrace it.

Like Christianity, however, Buddhism found no permanent favor among the people and in the land of its origin. It flourished in India for a time, but was rarely looked upon as more than a sect; after something over a thousand years it died out completely, except in Ceylon, at the very period that its hold on non-Indian nations to the north and east was strengthening. Its place was taken in India by the miscellaneous assemblage of cults, all theoretically recogizing Brahman ascendancy, that in the aggregate constitute what is known as Hinduism. Hinduism is not a religion in the sense that Christianity, Mohammedanism, Buddhism are "religions." It recognizes no personal founder, no head or establishment; it tends to exclude foreigners rather than to convert them; it is national instead of universal. It accepts and reinforces the existing institutions of its particular culture: caste, for instance, which Buddhism tried to transcend. Hinduism is therefore comparable to the ancient Greek and early west Asiatic religions in consisting of a series of locally or tribally different cults never integrated or fully harmonized, conscious and tolerant of one another, resting on common assumptions and similar in content, everywhere in accord with tradition and usage, resistive to organization into a larger whole but tied into a certain unity through reflecting a more or less common civilization.

Hinduism is also comparable to Confucianism and Shintoism with this difference. These grew up analogously, but early became associated with the central government or imperial authority, to which India never attained. They gradually became official religions, as which they survive; such religious piety as the population of China and Japan experiences finding its outlet chiefly through Buddhism. Buddhism may be said to have failed in India because it aimed at being a world religion; because it tried to be international instead of national, to overlie all cultures instead of identifying itself with one. The Hindu like the Jew preferred remaining within the limits of his nationality and particular civilization.

259. Relations Between India and the Outer World

The first culture influence whose entry into India can be traced in any detail was that carried by the Vedic Aryans from the northwest. In fact, as already mentioned, more is known about this importation than of what it encountered in India. In the post-Vedic period, the introduction of the Semitic alphabet suggests that other cultural ingredients also flowed into India from the west without direct record being preserved of their transmission. The Persian and Macedonian conquests extended only over the westernmost margin of India and were of little direct influence. But the latter was followed by a semi-Hellenization of southwestern Asia, including for instance the establishment of a Græco-Bactrian kingdom in southern Turkistan and Afghanistan, adjacent to India; and for several centuries a stream of Greek culture elements trickled into the heart of India. Sculpture, architecture, astronomy, drama, coinage, derived new impetus, in some cases even their origin, from this source. In some instances the Hindus were no more than copiers of Hellenistic models: Greek hangs and folds were given to sculptured garments, Greek astronomical measurements taken over without change. Yet as the centuries wore on and new imports along these lines lessened and then died out, the introduced elements became more deeply incorporated into Indian civilization, modified and encrusted more and more heavily by distinctive Hindu styles, until now their superficial appearance makes an impression of independent native growth. The working over of the Semitic alphabet into its Hindu forms may be taken as typical of the nature and degree of this remodeling of the Hellenistic culture imports.

Soon after 700 A.D. commenced a series of Mohammedan invasions and conquests—Arab, Afghan, and Mongol-Turkish—also from the northwest, and of course accompanied by a new series of culture influences—firearms, for instance, and the true arch—which in their turn underwent absorption and partial transformation.

The flow of culture between India and the Mediterranean world has not been wholly eastward. Cotton; the common domestic fowl; probably the buffalo and rice; perhaps asceticism, monastic life, and certain mystic points of view; position numerals with zero; chess; and some of the concepts of modern philology, were transmitted westward. Eastern Africa was influenced, largely through the medium of Arab sea trade. Towards the north and northeast as far as Mongolia and Japan, India has been a dispenser of culture content and has taken little in return. Toward the southeast, Indian influence has been the largest component in the civilization of Indo-China and the East Indian archipelago, which as regards their higher attainments may be regarded as cultural dependencies or extensions of India.

260. Indo-China

Farther India or Indo-China, the great southeastern peninsula of Asia, falls somewhat short of India and China in area, is less densely inhabited, and contains a population which is of definitely Mongolian type except for some scattered fragments of hill tribes. On the basis of speech, four groups are to be distinguished. In the southwestern and southeastern corners of the peninsula, in the former kingdoms of Pegu and Cambodia, are the Mon and the Khmer, certainly related to each other and perhaps distantly connected wtih the Malayo-Polynesian family. On the east are the Anamese, with a monosyllabic, tonal language whose affiliations are doubtful. It contains a Chinese element, but perhaps by absorption rather than by original connection. The center and west of Indo-China are occupied respectively by the peoples of the T'ai or Siamese-Shan and Tibeto-Burman groups, both probably collateral offshoots with Chinese from what may be called the original Sinitic stock (§ 50). The movement of population has clearly been out of inner Asia into the peninsula. The Mon-Khmer are situated like half submerged remnants. Burma on the map hangs from Tibet like the outgrowth that it probably is. Seven centuries ago, the T'ai empire was centered in Yünnan, in southwestern China. Siam represents a southward shift of the seat of T'ai power after Mongol conquest (Fig. 12).

The Malay peninsula is Siamese in its narrow or neck portion. The head is inhabited by three racial groups. The Semang in the interior are pure Negritos. The Sakai or Senoi, also in the interior, are short in stature, dark, and broad nosed, but wavy-haired. They resemble a series of hill tribes scattered from India to the East Indies: the Vedda of Ceylon, the Irula and other tribes of southern India, the Toala of Celebes (§ 27, 257). Perhaps the Kolarians or Munda-Kol of central India, the Moi and other groups of Indo-China, the Nicobar islanders, and certain nationalities of Sumatra are also to be reckoned as partial representatives of the same type. This race, if it is such, is generalized, with certain Caucasian and other Negroid but few Mongoloid resemblances. It is perhaps to be classed as Australoid, and has been named Indo-Australoid. The third racial group of the peninsula are the Malays, who, at least in large part, are emigrants in comparatively recent centuries from Sumatra. Culturally the Malay peninsula belongs with the East Indies rather than with Indo-China.

Three main layers of civilization are evident in Indo-China. The old native culture was allied to that of the East Indies and the islands beyond—whatever the speech may have been. Even to-day backward tribes of both regions, especially inland, often show strikingly similar customs: the use of bark cloth, for instance, separate houses for unmarried men and girls. This culture remains fairly well defined in spots as far west as Assam and the Kolarian region of India.

The two other civilizations have flowed in from India and China. Practically everything of higher culture in Indo-China traces back directly to these two countries. The Indian influence has been both wider and deeper than the Chinese. It brought in Buddhism and writing, and colored art and architecture. This Indian influence began more than two thousand years ago, and while it may have weakened somewhat after India's return from Buddhism to Brahmanism, it has never ceased. As there were no notable Indian conquests, this influence is an excellent example of the normal, gradual type of cultural pervading. Chinese contacts are equally old as the Indian, but have mostly remained confined to the area adjacent to the Middle Kingdom. The Anamese have adopted the Chinese system of family names, Confucianism, literary examinations, and the like, sometimes more largely as a conscious endeavor than in fact.

261. Oceania

From the Malay peninsula the vast island region of Oceania stretches eastward to within two thousand miles of America. Australia deserves to be set apart on account of its continental size, isolation, and ancient biological independence. Oceania proper falls into five natural divisions. These are Indonesia or Malaysia [1] or the East Indies, where large islands are scattered among many small ones; Papua or New Guinea; and three tracts of relatively small, widely separated islands rising out of the depths of the Pacific: Melanesia, a broken chain southeastward from New Guinea; Micronesia, to the northeast; and Polynesia, far eastward. Two primary facts stand out in regard to the inhabitants. Papua and Melanesia are peopled with blacks, the Oceanic Negroids; the other regions have brown inhabitants of prevailingly Mongoloid affiliations. Linguistically a single fundamental speech, the Malayo-Polynesian, prevails over all of Oceania except Papua, whose tongues so far as known fail to connect with any others or with one another. Large unanswered problems inhere in these distributions: how the Oceanic Negroids are related to those of Africa, from whom they are so remote geographically but whom they resemble so strikingly in type; how the black Melanesians came to talk dialects of Malayo-Polynesian,[2] which otherwise is a speech of brown peoples.

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[1] The Malays proper, whose home until the twelfth or thirteenth century lay in Sumatra, are to be distinguished as a particular people from the Malaysian or East Indian group which we name after them, in the same way that the Mongols are a nation which is but one of many that constitute the Mongolian race and Mongoloid stock.

[2] Several languages in the interior of the larger Melanesian islands have been described as non-Malayo-Polynesian. If they confirm as such, they may be regarded as survivals of a group of languages which were the original tongues of the Melanesians and are probably to be classed with the Papuan languages. The Malayo-Polynesian speech of the majority of the modern Melanesians may in that case be considered as having been

More in detail, there are questions such as where and how the Polynesians developed their somewhat aberrant racial characteristics; what may be the relations of a more and a less specifically Mongoloid, a broader and a longer headed strain, among the East Indians; and whether the latter of these connects racially with the "Indo-Australians."

262. THE EAST INDIES

Culturally, the East Indies are the most diverse of the Oceanic regions, in that the various islands, and within the larger islands adjacent districts, sometimes contain populations heavily tinctured with Asiatic civilization, sometimes tribes whose customs are far more aboriginal. However, there is no people in the East Indies that has wholly escaped the influence of Asiatic culture: the difference is always one of degree, although ranging from what is currently called semi-civilization to savagery. The profoundest influence has been exerted by India. This began nearly two thousand years ago and remained active for over a thousand; it introduced architecture, sculpture, writing, monarchy, religion, iron, cotton, and a host of other elements of higher culture. The earlier Indian influence was Buddhist and its seat of power centered in southern Sumatra; the later was Brahman and reached its zenith in Java. The number of immigrants was probably small, their effect enormous. A group of refugees, a younger son of a royal house with his retinue, a band of adventurers, would found a colony, sometimes conquering the natives, sometimes attaching them peacefully to their leadership, and soon a little kingdom was flourishing, which in time sent out other offshoots or absorbed its rivals until its name commanded respect and tribute for long distances across the sea. It was a procedure which the Mohammedanized Malays later repeated over the East Indies, and which on the Asiatic continent some centuries earlier had carried Chinese civilization far to the north and south of its original limits, and Aryan speech and culture

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taken over through contacts with brown peoples of a higher culture. A similar situation exists in Madagascar, which in race is predominantly Negroid, but whose speech is purely and whose culture largely Malaysian.

throughout India. The kingdoms struggled, throve, decayed, and succeeded one another; the permanent aspect of the process was the ever deeper though irregular permeation of life with new arts and ideas.

The influence of China came later and was less than that of India. In the thirteenth century the Sumatran Malays were converted to Mohammedanism and began a career of expansion which culminated in the complete conquest of Java by 1478, carried their faith over much of the area, and was checked only by the advent of the Spaniards, Portugese, and Dutch. Mohammedanism, besides its cult and law, introduced some new elements of culture, such as firearms; but perhaps its most important effect was that it put an end to the growth of the specifically Indian type of influence in Malaysia.

Underlying these strains from the historic civilizations of Asia was a semi-primitive culture, many of whose elements were shared by the East Indians with the Indo-Chinese and Melanesians, and which in part can be traced from India to Polynesia. This Indo-Oceanic culture included agriculture—with rice and sugar cane in Malaysia and on the mainland; domestic animals of its own—the buffalo, pig, and fowl—different from those of north and west Asia; pottery, bark clothing, possibly bronze, though if so this was intrusive; men's clubs or sleeping houses; a non-political organization of society on the basis of kinship and tribal community; and such practices as head hunting and skull cult. The employment of bamboo and rattan was a prime characteristic, and seems to have prevented a vigorous stone age from having flourished in the East Indies and adjacent regions. Bamboo is perhaps capable of serving more different cultural uses than any one other plant. It makes satisfactory houses, rafts, knives, spears, bows, arrows, blowguns, textiles, cooking vessels, receptacles, and musical instruments, with a minimum of labor. It is best worked with metal tools, and has therefore perhaps experienced its most thorough utilization at the hands of peoples too backward to secure a large supply of metals for themselves but able to obtain a limited stock of iron from their neighbors. Nevertheless even the prehistoric culture of the region is likely to have made large use of bamboo.

This primitive culture of course varied locally. It was also not of unitary origin. It certainly contained elements that were older than others, or that originated in different parts of the area. Rice and fowls for instance are likely to be more recent than skull cult and use of bamboo. The culture may even resolve, when it shall have been analyzed more intensively, into two or more fairly separable strata. But, taken in block, it must once have prevailed with fundamental similarity from eastern India well out into the Pacific, since everywhere within this tract there are to-day hill and jungle peoples whose culture conforms at least roughly to the type. It is necessary to remember, however, that nowhere does this culture survive in purity. To some degree the influence of the greater Asiatic civilizations has made itself felt among the most aloof tribes. They mix a few Hindu religious concepts with their head hunting rituals, for instance, or know how to forge imported iron, or even grow American maize. They have everywhere been exposed in some degree to contact with cultures of subsequent level. Thus it is characteristic that the Negritos, whose scattered distribution indicates that they may have been the first inhabitants of the East Indies, possess a debased or parasitic Malaysian culture instead of a specific Negrito one.

263. MELANESIA AND POLYNESIA

As one passes out from the East Indies into New Guinea and Melanesia, the mass effect of Hindu and Mohammedan civilization comes to an end, and the primitive culture that has been outlined is altered. Metals, rice, the buffalo, disappear. The growing of taro and other tropical plants, the pig and fowl, the use of bamboo where nature permits, skull cult or cannibalism, remain. Other features, such as the totemic and matrilinear moiety organization of society and adolescence rites for girls, obtrude, and are sometimes elaborately developed. How far such traits represent secondary local developments or on the other hand survivals from a Negroid culture phase anterior to that of primitive Malaysian-Southeast Asiatic culture, is not clear. Local diversity of custom is unusually great in both New Guinea and Melanesia.

Micronesia and Polynesia present a different although allied set of problems. The Polynesians in particular manifest a remarkable uniformity of speech and, on the whole, of culture, especially in view of the thousands of miles of ocean through which their island groups are dispersed. This uniformity suggests that the language and culture became characterized in a limited area from which they spread over Polynesia after or while contact with the remainder of the world was lost. But it is difficult to settle even tentatively on such an area of original characterization because certain sides of Polynesian culture are relatively high and carry suggestions of Asia, whereas other elements are lacking which would be expectable if higher Asiatic influences had ever carried to the ancestral Polynesians. Royal lineage, for example, bears to the Polynesians a powerful implication of sanctity, of descent from the gods, such as is unparalleled among any truly primitive people. Religion and mythology also contain an abstract, spiritual strain that is almost reminiscent of Buddhism. Yet there seems no single specific idea or name that can be traced to an Asiatic source; and the essentially ancient ideas of magic and taboo are strong —the word taboo itself is Polynesian. There are structures and sculpture in stone, sometimes monumental, but never more than barbaric in quality. The absence of metals may mean little, since they might have been possessed but the art have been lost in the island habitat, often coralline. Yet pottery, the bow and arrow, the men's club house, the clan or moiety type of society, are also wanting or weakly developed. On the other hand, the dog, pig, and fowl, cultivated plants like taro, bark cloth, cannibalism, and human sacrifice are shared with the island regions to the west.

The various Polynesians possess genealogies and often migration traditions which on comparison, and after computation of the number of generations, seem to point to two waves of migration, both within the Christian era, perhaps about the fifth and tenth centuries respectively. The traditions fail, however, to throw clear light on the area of origin, since they attribute this either to Hawaiki, which may be either Java or a mythical land, or crisscross back and forth among the island groups within Polynesia. Something of the mysteriousness which the discoverers felt continues to attach to the origin and history of this people, and is deepened by the fact that the affiliations of their racial type remain ambiguous.

264. AUSTRALIA

The human history of Australia is as detached from that of the remainder of the world as its biological history. The race is distinctive: sub-Negroid, it might be called. The languages relate to no other. The culture is primitive and well characterized. The isolation of Australia was aided by the fact that the one approach to it other than by a sea-voyage of some length, the approach across Torres Straits, was blocked by New Guinea, the area of most backward culture in Oceania. The Papuans did not possess enough civilization to hand on much to the Australians; but they prevented higher elements from Asia from flowing to them.

The Australians lacked not only all agriculture and domestic animals, but pottery, the bow, and apparently the harpoon. These deficiencies would at once stamp their culture as pre-Neolithic in type, were it not that they grind some stone implements.

All in all, Australian culture is unusually meager on the industrial and economic side. Houses, clothing, weapons, boats, tools, are most scantily developed: often lacking and always rude. This poverty of Australian material culture cannot be explained wholly from the prevailing desert character of a large part of the continent, since the natives of the most favored regions were not appreciably better off as regards variety of arts conducive to comfort.

Social organization is much more complicated than the arts. Most of the Australians are divided into moieties, which frequently are subdivided into four classes or eight-sub-classes, all exogamous. A frequent peculiarity is that the child belongs to a different class from both its parents. So far as the moiety is concerned, custom varies locally as to whether the child is born into the mother's or father's side of the community. Frequently there are also hereditary totemic groups. These may be subdivisions of the moieties or descend independently of them. A few tribes, chiefly in southeastern Australia, are without moieties or classes; some are totemless (Fig. 29). The moiety scheme of course prescribes equally that one must marry into the opposite moiety and out of one's own. The extension of this principle to classes and sub-classes still farther limits the group among whom marriage is permissible, thereby emphasizing its prescriptive character. Where the individual belongs to a third or different class from his parents, his wife must come from the fourth or remaining one, and his children will belong again to the first or second, according as moiety descent is patrilinear or matrilinear. Consequently he has blood relatives in every class; and conversely all the members of each class stand in a certain defined kinship to every individual in the community, according to their respective sex and age. This means not only that certain relatives are within the absolutely prohibited degrees, but that others are prescriptive spouses. These are only a few of the innumerable ramifications and variations of Australian social organization.

The origin of these social schemes is in dispute. Some ethnologists interpret them as original inventions of the Australians, manifestations of their peculiar primitiveness. Others look upon then as evolved somewhere in the region between India and Melanesia where analogous institutions are frequently encountered, and as carried into Australia by diffusion or migrations. The contiguity of Australia to the Indo-Melanesian area of totems, moieties, unilateral descent, etc., is not likely to be wholly a matter of coincidence (§ 110). Moreover, the strongest development of this type of organization within Australia is on the whole in the northern part, the tribes that show least or none of it being in the south, farthest from the presumptive entrance via New Guinea. On the other hand, certain features of the systems are confined to Australia: the classes and subclasses, the occasional coexistence but non-relation of totems and moieties, for instance. These variations must have originated among the Australians; and this raises the question whether many other traits may also be indigenous. The most probable course of events would appear to have been the importation of the basic pattern of exogamy, followed by its diffusion with numerous new growths in Australia.

Religious status fits the same interpretation. Ceremonia practices are often both abundant and elaborate, but ring the changes on fundamentally primitive concepts like imitative magic, bewitching, taboo, adolescence and other crisis rites. These concepts, as implicit in a series of customary acts, might all have been imported at a very early time; in fact in the main very likely go back to Palæolithic culture. On this foundation the Australians developed their locally varying superstructures of religion, which often differ conspicuously in specific content, and into which they poured a notable quantity of imagination or social creativeness. They evolved nothing of a fundamentally "higher" type of cult because of their unusual degree of insulation from all the more important later streams of culture. There occurred no significant import of either new religious elements as such, nor of material factors like agriculture which might have raised the economic status, increased the population,[1] forced a political organization, and ultimately led to the growth of basically new religious patterns among the Australians themselves.

To return to material culture, it may be noted that the boomerang groups with Australian rites and social organization in being a highly specialized form of a fundamentally simple and presumably early type, namely the throwing stick or flat club. Crescentic throwing sticks are in use in Asia and America: they fly faster and straighter than rod shaped or knobbed ones. The Australians alone added the twist which gives the boomerang its peculiar flight. They may have been led to evolve this feature through not having higher types of weapons such as bows and arrows to engage their interest and energies. At any rate, the discovery of the quality imparted by the twist may have been made by accident, such as the warping of an implement, and random experimenting may have brought the improvements.

Whether the relatively unimportant implements of ground stone in Australia represent an invention made there or should be considered one of the small group of culture elements which like the moiety system may have been imported subsequently to the main stock of Australian culture, remains to be ascertained. This main stock is certainly ancient, and in its content may be regarded as approximately equivalent to the Palæolithic culture of Europe and probably connected with it by an early diffusion; although in the specific forms taken by their corresponding types the two cultures obviously differ greatly, as indeed the lapse of time and stretch of distance between them would render inevitable.

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[1] The population attained only to a minority fraction of a million, per haps not over 150,000 all told.

265. Tasmania

Tasmania is situated toward Australia as Australia is toward Asia-Oceania. It constitutes an ultimate periphery. Of what little culture Australia had received from the remainder of the hemisphere, Tasmania again received only a part. The prevailing opinion that the Tasmanians were the most primitive of recent peoples is therefore probably justified. They lacked everything that the Australians lacked; and in addition lacked spear-throwers, boomerangs, shields, and ground stone tools. They are the one population among whom it seems reasonably certain that a culture of Palæolithic type was preserved unmixed until modern times. They had chipped knives, axes, scrapers, and similar tools; wooden spears and clubs; bark rafts; windbreak huts; cordage and baskets; paint; ornaments of bone and other animal parts. Unfortunately the Tasmanians numbered only a few thousands, died rapidly on contact with civilization, and became extinct in the nineteenth century before scientific study of their culture or speech had been made. Their religion and society therefore perished almost unrecorded. Their racial type is preserved in skeletal material and photographs. It is clear that it differed from that of the Australians. Their hair was woolly. They have consequently sometimes been reckoned as Oceanic Negroes rather than as an Australian sub-type. It is likely that they represent the first human strain to enter Australia, which was later absorbed or exterminated on that continent by the Australians, surviving only in the protected island of Tasmania.

266. Africa

Africa is the second largest of the continents, the most compact and least indented, and, except for Australia, the most deficient in great mountain systems and the most arid. The only considerable forested area lies in its west central portion; the remainder ranges from parkland through steppe to desert. The population is the densest of any continent reckoned as prevailingly uncivilized: a hundred and twenty-five millions or more, some ten to a dozen souls to the square mile.

As regards its races, it is important to remember that the northern third or half of Africa is inhabited by native "whites." There is much confusion on this point. We tend to say African when we mean Negro. Until recently the word Moor in north European countries often meant Negro, although it denotes Mauretanians, Moroccans, who are Caucasians. It is true that almost across the breadth of Africa there is a transition zone in which it is arbitrary to classify the population as definitely Negro or Caucasian. But over the vaster bulk of the continent, there is never doubt as to the substantial distinctness of the racial stocks.

The oldest stone age is well represented. Implements of Chellean type in particular have been discovered in a number of areas. Whether these are contemporary with the Chellean remains of Europe is not wholly certain, since they are generally surface finds. An Upper Palæolithic phase, the Capsian, with three sub-periods, is well established for North Africa (§ 215). It was approximately coeval with the Aurignacian, Solutrean, Magdalenian, and probably Azilian of western Europe, and influenced them. Syria and Spain were largely Capsian in culture. The Neolithic is less well marked as a distinctive phase in Africa; and evidences of a separate Bronze Age, other than in Egypt, have nowhere been discerned. There is a bronze art with casting in lost molds in Benin. This is of undetermined origin. It may be ancient; but so far as can be told to-day, iron came into use in much of Africa as early as bronze, and is worked by modern tribes who do not know bronze. Dolmens and other megalithic monuments are abundant in north Africa, absent south of the Sahara. Some of them are later than the similar European megaliths, since iron horse-bits have been found associated with them. It is evident from this summary that Europe and Africa have been closely associated in their prehistoric culture, especially in its remote stages. Two sets of fossil human remains corroborate the connection: Grimaldi man of Italy was pre-Negroid in type, Rhodesian man more or less Neandertaloid.

Iron is smelted, worked, and used throughout Africa except among the dwarf tribes. Apparatus and technique are usually simple, but efficient. Smiths often constitute a caste, sometimes a wandering one. Some tribes rank them highly, others repute them wizards, nearly all accord them a special social position. There is no other area so large and culturally so backward as Africa south of the Mohammedan belt, in which an iron industry flourishes. The existence of the art therefore raises a problem. Some have thought that its origin was indigenous, that perhaps even Egypt derived its knowledge of iron from Negro peoples. On the whole, however, it is much more probable that the reverse holds. In the more than three thousand years since iron was worked in Egypt, the process could readily have been transmitted through the continent. The long lapse of time, the distances traversed, the comparative cultural backwardness of central and south Africa, would allow for, in fact would almost dictate, both the simplicity and the specializations of the technique.

267. Egyptian Radiations

Ancient Egyptian influences have penetrated Africa more significantly than has generally been thought. It is only recently that a beginning has been made in tracing them out in detail in the Nile Sudan. For so intensive a civilization as that of Egypt to exist in juxtaposition to the southeastern Hamitic tribes and the Negroes for five or six thousand years without radiating innumerable elements of culture into their life would be unparalleled. In fact the dynastic Egyptians used materials like ostrich feathers that were imported from far south, and depicted Negroid physical types. The trade and association involved must have flowed both ways. The elements most typical of Egyptian civilization, and its fabric and organization, need by no means have been imparted along with the elements that were transmitted. The fact that they were not seems to be what has delayed wide recognition of Egyptian influence in Negro Africa. The general character of the culture of a modern central African tribe and of the ancient Egyptians being so profoundly different, diffused culture ingredients would therefore often appear among the Negroes in a different form, and always in a different setting, thus tending to disguise their historic connection. The failure of certain Egyptian traits to seep through Africa is also readily accounted for. A backward population broken up into small communities without much stability would have difficulty fitting such an art as writing into their scheme of life, in fact would find it useless. It is therefore not surprising that none of the un-Mohammedanized tribes of the continent write. Similarly, masonry would be needless, perhaps economically unfeasible, under the prevailing social conditions of central Africa. On the other hand, so obviously utilitarian an art as iron working might be quickly taken up, once it had been brought into a simple technique. In the same way, an adaptable domestic animal or plant would tend to be accepted and diffused, while a concomitant scheme of political organization or elaborated religious system might fail to make even a beginning of penetration. It is in this way that several animals of Asiatic origin came to be kept through considerable parts or almost the whole of Africa; the horse, camel, sheep, fowl, for instance, of which at least the first two entered through the gateway of Egypt.

This does not mean that all constituents of African culture have their origin in Egypt; still less that the colors or patterns of African cultures can be derived from that country. However great a bulk of culture may be absorbed by one people from another, the organization which is given this, the stamp put upon it, is necessarily more or less distinctive, because the introduced constituents meet others already established; and especially because the recipient culture, even if low, already possesses a form of its own into which it unconsciously attempts to fit the new content, and into which, unless the influx is sudden and great, it usually succeeds in fitting the imports for a time.

However, any specific culture trait common to ancient Egypt and the modern Negroes is suspect of a common origin, which ordinarily—though not universally—would mean an Egyptian or more remote origin. Yet the resolution of such a suspicion is not always easy. Much depends on the extent and continuity of the geographical distribution of the trait, and on the actuality and specificity of the resemblance. On these points the necessary information is often still incomplete.

The general relation of Africa as a whole to Egypt is paralleled by the relation of western Europe of four thousand years ago to the Orient. The bronze, cereals, tamed animals, and many other culture elements of Europe, including religious traits like the ax cult, can be derived from the Near East. But the cities, monarchies, temples, inscriptions, astronomy, and art of the Orient had not penetrated to farther Europe. Moreover, European Bronze Age culture was not merely Oriental civilization with half or three-fourths its content omitted. It enjoyed an organization of its own, followed local and at least partly original trends, possessed what might metaphorically be called an organic unity as great as that of any Oriental culture.

268. The Influence of Other Cultures

Two other great cultural influences have long affected Africa. As far back as the strictly historic period extends, its Mediterranean shore has been generally under the control of peoples belonging to Western civilization—Carthaginians, Romans, or Arabs. As in the case of Egypt, it is unthinkable that the cultures thus planted in the north could have been wholly without effect on the remoter parts of the continent. In fact, for the Arabs, who both penetrated the farthest and are the most recent comers, influence far into the Sudan is manifest. The other exposure was toward the east, and here, as might be expected, Indian influences, chiefly sea-borne through Arab restlessness, have been potent. Eastern Africa has hump-backed cattle, cotton, the pit-loom, perhaps the fowl, from this source. Madagascar, though mainly Negro in race, is Malaysian in speech and prevailingly Malaysian in culture as the result of similar maritime influences from the east.

In these lights, much of African culture which cannot yet be definitely traced to an extra-African source and which until recently was generally assumed to be of purely native origin, may prove to be due to transmission from Asia or Europe. The powerful kingdoms repeatedly established by successful leaders among both Sudan and Bantu Negroes, kingdoms embracing diverse tribes and sometimes continuing under the same dynasty for several centuries, may be due to Egyptian or Mohammedan example. The same can be said for the prevalence of slavery, which is both more widespread and more important economically in Africa than in any other large region of similarly retarded cultural level. Possibly the frequency of polygyny belongs in the same category. It is true that Negro economic life is generally so organized that wives represent investment and create wealth. This fact might be the result of the influence of old economic tendencies upon introduced polygyny. Or the form of marriage might be the outcome of the economic scheme of life characteristic of Africa. Yet even in the latter case an indirect foreign causation can be suspected, since primitive peoples, at any rate those unquestionably beyond the influences of the Eur-Asian civilizations, like the Australians and Americans, generally do not place heavy social stress on wealth. The African point of view as regards economic success, with the African attitude toward marriage as a consequence, may therefore be partly due to extra-African stimulus and example.

Such stimulus seems more easily demonstrable for the proverbs and riddles which abound in Africa, since proverbs were completely and riddles almost wholly wanting in the western hemisphere, and are therefore not the native and spontaneous outflow of the human mind which our own familiarity with them might tempt us to take for granted (§ 90).

The totemic and exogamic institutions of Negro Africa (§ 110) are difficult to understand. Their distribution, both in totality and as regards their several forms, is patchy. Clans sometimes coexist with castes or occupational classes, sometimes tend to coincide with them. Matrilineal institutions crop up irregularly among prevailingly patrilineal ones. In several separate areas the totemic and exogamic groups are divorced, even following opposite lines of descent. The large blocks of peoples sharing substantially the same form of organization in Australia, the regularity of regional and typological graduation of forms of organization characteristic of North America, find no counterpart in Africa. The reason would seem to be that the Australian and American cultures developed in isolation and from within, undisturbed; whereas Africa has long been subjected to a cultural bombardment which constantly mingled new traits with old, foreign with acclimated, and acclimated with indigenous. The native cultures were therefore unable to follow the relatively smooth sequence of development by area or stage which occurred in Australia and America; the injected ferments caused a cultural bubbling in which elements dissociated, combined, intensified, or disappeared according to intricate circumstances. It is possible that other phases of African culture owe their appearance of randomness under classification to the same set of causes.[1]

269. The Bushmen

Two local culture-areas, as they would be called on American soil, emerge with fair distinctness: The Bushman and the West African.

The Bushmen of the far south about the Kalahari desert are distinctive in both race (§ 26) and speech. Culturally they also stand apart as an exceptionally primitive people, lacking the agriculture, cattle and fowls, and iron working of the Negroes. They are expert hunters, stalking or wearing down game until it is within range of their poisoned bone or stone pointed arrows, while the women pry up roots with stone weighted digging sticks. They live under rock shelters or on the leeward side of rude windbreaks. Subterranean water is sucked up through reeds and kept in ostrich egg shells. All this suggests an early Neolithic or even largely Palæolithic culture type, which accords well with the remote and environmentally unfavorable habitat. It is as if the peripherally situated Bushmen had retained up to the present, and with few additions, the culture that prevailed in Europe ten thousand years ago. It is certainly striking that they carve and paint animal figures on rock faces and in caves with a fidelity and unconstrained naturalism that remind of Magdalenian art.

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[1] It may be corroborative of this interpretation that totemism and exogamy are more irregularly distributed, and therefore more difficult to reconstruct as to their history, in South than in North America. The Tropical Forest area. in which these institutions occur in South America, has long been exposed to the influence of the higher civilization of the Andean region, much as Africa has been exposed to Europe and Asia.

The Hottentots, who are neighbors of the Bushmen and approach them in physical type, appearing to be a mixture of Bushman and other blood, are culturally less retarded, having cattle and iron. In central Africa another dwarf black race, the Pygmies or Negrillos, probably represent a people of once primitive status. But their actual cultural condition is parasitic rather than natively primitive, thus resembling that of their relatives the East Indian Negritos. They live among Negro tribes, acknowledge their kings, trade forest and hunting products for the agricultural yield and manufactures of the Negroes, and speak dialects of the latter's languages. They thus constitute a racially accentuated caste or economic class within Bantu culture; and although shy and backward, cannot be said to preserve a relatively pure early culture as do the Bushmen.

270. The West African Culture-area and Its Meaning

Over the larger northern portion of the Congo drainage and along the Guinea coast from the Niger mouth to the Senegal, there prevails a well defined West African culture. This is marked by a number of traits which within Africa are approximately confined to it. These traits include the cultivation of the banana but general absence of millet and cattle; gabled houses of thatch, other Africans building domed or conical structures or mud dwellings, clothing of palm fiber or bark; straight self-bows with pointed ends and encircling ridges for the attachment of the looped cord of rattan; shields of wood or cane, in place of which other Africans employ leather bucklers, shields of hide, or parrying sticks; face masks for religious purposes; carvings of the human form; slit wooden drums; xylophones; and a number of other traits.

Two interpretations can be suggested for this consistent and geographically limited association of traits. One makes use of the recurrence of many of the elements in the Indo-Oceanic and especially the Melanesian area. As the latter is also Negroid territory, an ancient connection is conceivable. This would obviously have to be old enough to precede the Egyptian, west Asiatic, and Indian-East African culture developments. These later growths would be interpreted as having spread less far, although obliterating the antecedent Negroid culture so far as they did diffuse. This explanation fits well with the principle that, other things equal, superposed culture strata appear centrally, underlying ones survive marginally. Proof, however, must depend on whether the parallel traits are really specifically similar, whether they constitute a reasonably large proportion of the culture of the two areas, and whether they are lacking in the intervening region. This evidence is naturally difficult to assemble.

The other interpretation is less incisive. It looks upon the resemblances as at least partly conditioned by environment; and would tend to explain the remainder as due to a diffusion, early indeed, but gradual and applying to single elements or small clusters of traits rather than to an association of traits large enough to form a culture and moving as a single block. In this connection it is significant that the Oceanic area is one of tropical forest, and the West African area the only large forested tract in its continent. Hence the absence of cattle and open-country grains, the use made of the banana. Hence too the possibility of bark cloth; and the extremely serviceable rattan cord, which in turn may have demanded a certain type of bow; whereas other types, like the sinew-backed bow, would be unsatisfactory in the humid climate. And the carving of wood, while not due to the forest, was at least made possible by it. In short, diffusion may have been the motive power involved, but like environmental conditions in the two areas caught and helped to preserve such elements as were diffused—stabilized the culture once it was adapted to the soil and rendered it more resistive to importations of traits worked out in different climates. This interpretation at any rate makes smaller assumptions than its competitor, and serves as an illustration of the need of environmental conditions being kept in mind in the explanation of culture, even though the essential explanation be in social or cultural terms.

271. Civilization, Race, and the Future

Culture may be independent of race; possibly is wholly so. But culture must be carried by races of some sort; and it may be of interest to consider whether the sweep of culture history reveals certain races as the most favorable carriers or as inherently constituted to be producers and dispensers of civilization (§ 44-46).

On the whole, the greatest share of culture production has fallen to Caucasians. The art of Upper Palæolithic Europe, the laying of the foundations of modern civilization along the Nile and Euphrates six or seven thousand years ago, the more special ancient efflorescences like that of Crete, not to mention most of the advances of the last twenty-five hundred years, all fall to the account of the white race.

The part of the Mongoloids must not be underestimated. Even if the foundation of Chinese civilization prove to be largely western, its main structure is native, and the alien elements that flowed in during the last three thousand years have been thoroughly adapted to this structure. The fact that derivative civilizations like the Japanese have succeeded in reaching a high degree of organization and refinement argues still further for the vigor of Chinese culture. Then, the East Indians, another Mongoloid branch, have shown a fair power of assimilation. In the past two thousand years they may be said to have accepted and digested at least as much of Hindu and Mohammedan civilization as the North Europeans took over from Mediterranean sources between 1500 B.C. and 500 A.D. Finally, the achievements of the American Mongoloids in Mexico and Peru must be given heavy weight because they appear to have been made in utter isolation, without the stimulus of contact or import, and on the basis of nothing more than a late Palæolithic or earliest Neolithic culture.

The share of the Negroids in the higher advances has been small. Africa, to be sure, lies off to one side from the great Eur-Asian axis, and like southern India and Arabia has suffered from constituting almost a blind alley. Yet central Africa is no farther from the Mediterranean than is northern Europe. East Africa lies open to Egypt which six and five and four thousand years ago represented the apex of civilization. Yet Negro Africa to-day possesses scarcely more culture elements of Egypto-Babylonian origin than remote Scandinavia had absorbed by 500 B.C., and far fewer than Scandinavia had in 1000 A.D. It is hard to believe that this difference is due wholly to desert and jungle and tropical heat.

There is a parallel in the Oceanic Negroes. The Australians may be disregarded in this connection, both on account of the isolation of their continent and the doubt whether they are to be reckoned as a branch of the Negroid stem. But the Papuans and Melanesians are undisputedly Negroid and far less touched by influences of higher culture than the adjacent East Indians. It may be only geographic accident that writing and iron and kingship and Hindu and Arab religion traversed the Oceanian islands as far as the brown Mongoloids inhabited them, but stopped dead at the threshold of the blacks. Even the brown Polynesians, much more remote in the central Pacific than the Melanesians, possess more elements that are presumably traceable to Asia—such as their cosmogony, genealogies, kingship.

It is of course not fair to argue from cultural accomplishment to racial faculty unless all times and parts of the world are considered equally, and not safe to interpret the evidence too rigorously then. But the consistent failure of the Negro race to accept the whole or even the main substance of the fairly near-by Mediterranean civilization, or to work out any notable sub-centers of cultural productivity, would appear to be one of the strongest of the arguments that can be advanced for an inferiority of cultural potentiality on their part.

Yet the weakness of correlation of race faculty and civilization, except in the most general way, can be driven home to North Europeans and North Americans as soon as the relative parts played in culture history by the several Caucasian divisions are examined. On the ground of long continued lead in productivity, of having reared the largest portion of the structure of existing civilization, the Mediterranean branch of the Caucasian race would have to be awarded the palm over all others. To it belonged the Egyptians; the Cretans and other Ægeans; the Semitic strain in the Babylonians; the Phœnicians and Hebrews; and a large element in the populations of classic

Greece and Italy, as well as the originators of Mohammedanism. With the Hindus added as probably nearly related, the dark whites have a clear lead.

The next largest share civilization would owe to the Alpine-Armenoid broad-headed Caucasian branch. This may have included the Sumerians, if they were not Mediterranean; comprised the Hittites; and contributed important strains to the other peoples of Western Asia and Greece and Italy.

By comparison, the Nordic branch looms insignificant. Up to a thousand years ago the Nordic peoples had indeed contributed ferment and unsettling, but scarcely a single new culture element, certainly not a new element of importance and permanence. For centuries after that, the center of European civilization remained in Mediterranean Italy or Alpine France. It is only after 1500 A.D. that any claim for a shift of this center to the Nordic populations could be alleged. In fact, most of the national and cultural supremacy of the Nordic peoples, so far as it is real, falls within the last two hundred years. Against this, the Mediterraneans and Alpines have a record of leading in civilizational creativeness for at least six thousand years.

It is clear therefore that any fears of the arrest and decay of human progress if a particular race should lose in fertility or become absorbed in others, are unfounded. Such alarms may be attributed to egocentric imagination. They resemble the regrets of an individual at the loss which the world will suffer when he dies; what he really fears is his own death. When we loosen the hold of such narrow and essentially personal emotions, and allow our minds to range over the whole of the labors and gradual achievements of humanity, irrespective of millennium or continent, the result is an imperturbed equanimity as to the slight and temporary predominance of this or that racial strain and as to the stability or future of culture. To contribute to this larger tolerance and balance of mind is one of the functions of anthropology.

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